Open Access

EDITORIAL

Caught Off guard by COVID-19: Artificial Intelligence for Rescue!

Naila Siddiqui Kamal
Senior Lecturer, Imperial College London
Associate Director, Medical Education, LNWUHT NHS UK

Needless to say, we are witnessing a once in a lifetime health crisis. The scale and impact of the pandemic has motivated researchers to understand the virus (SARS-CoV-2),[1] its mode of spread and search for effective treatments and vaccines. Public health and population health sectors are at the forefront of predicting and preventing disease outbreaks. There is a subtle difference in their remits. Public health works to protect and improve the health of communities through policy recommendations, health education and outreach, and research for disease detection and injury prevention. Population health is defined by groups of stakeholders as "the health outcome of a group of individuals, including the distribution of such outcomes within the group".[2] Population health departments look at proactive approaches to a given population with attention directed toward larger, socially grouped needs and prevention efforts while reducing disparity and variation in care delivery. Hence, we have seen a paradigm shift from a reactive medical framework to a more proactive preventive approach.

Having said that, could COVID-19 pandemic have been predicted?[3] It can be argued that traditional prototype of delivery of healthcare would be unable to make such a prediction. However, if there was a widespread engagement with disruptive technologies, that enthusiasts have been advocating for some time, then it was most likely possible as claimed by Artificial Intelligence (AI) experts.

The world was unprepared for a disease of this level of contagiousness and impact on the vulnerable. What would have been a good warning trigger, is real time data for analysis. This is where Artificial Intelligence plays a major role.[4] When large data has to be collected and analyzed, AI based systems are invaluable. Artificial Intelligence relies on an intelligent agent (IA), an autonomous entity which directs its activity towards achieving goals upon an environment, using observation through data received either by manual input or directly by sensors and devices. Intelligent agents may also learn or use knowledge to achieve their goals. They may be very simple or very complex. In plain words, AI can be developed by inputting algorithms that enable the machine to analyze data and make recommendations.

In situations such as the COVID-19 pandemic, what would have made a huge difference in combatting its onslaught? The first and foremost point would be a forewarning, with risk stratification of the susceptible population. This would be followed by assistance on resource management, real time tracking of spread and future predictions on flattening of the curve of incidents, respectively.

Correspondence:
Naila Siddiqui Kamal
Email: naila.siddiqui07@imperial.ac.uk
Cite this editorial*: Kamal NS. Caught Off guard by COVID-19: Artificial Intelligence for Rescue!. J Islamabad Med Dental Coll. 2020; 9(2):. 76-78*
Doi: 10.35787/jimdc.v9i2.547

For these factors to be in place, there is a need for a behavioural change amongst populations as well as clinicians. People need to become more vigilant and insightful on their current health status and their vulnerability to emerging disease trends. For this, they would need to have a way of recording new onset symptoms which can be communicated to relevant population health stake holders, who have AI-based dashboards showing the emerging trends in new onset symptoms and outcomes (Figure 1).

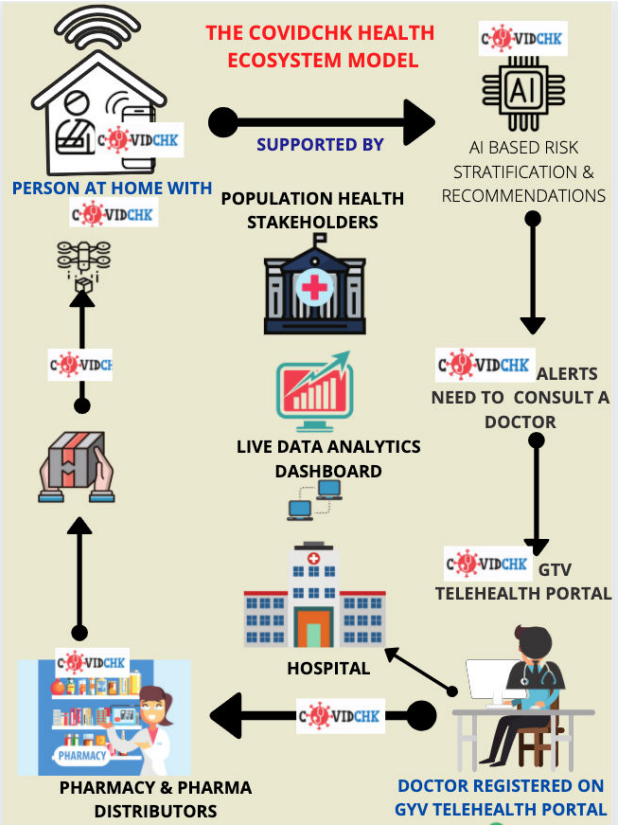

Figure 1: A visual info-graph made by the author depicting stakeholders of a basic health eco-system. (For explanation see "Case study: Introducing COVIDCHK BOT" at the end of this editorial).

We are witnessing a watershed moment at this time, in this century, as far as transformation in health care delivery and management is concerned. Remote access such as tele/video health systems will find a more central place in delivery models. In the near future, holograms will enable the clinician to the bedside of the patient wherever that may be; clinical decision making will be heavily reliant on evidence-based algorithm-based AI solutions; clinical data will be collated as Big Data for machine engines to spurn out forecast models of predicted health outbreaks; population health will take a central role in the myriad of specialties; precision health with specifics about individuals based on genomics data analysis, will become vogue and health care providers will be working in a more technologically enabled environments (Figure 1).

The main question left somewhat unanswered is, 'will we be a healthier society?' This depends on a number of 'ifs'. If all factors become aligned and live up to their expectations, then an optimist would say 'Why not?' But amongst all of these futuristic modelling, the one resource that remains central to all enabling factors is, the clinician. One cannot underestimate the emotional intelligence (ET)[5] that human interaction brings to these models. AI does not disrupt the role of a clinician, rather it enables the clinician to be much more informed and capable to deal with health-related challenges.

References

1. Janowitz T, Tuveson DA. The Era of COVID-19 and the Rise of Science Collectivism in Cancer Research. Cancer Discov. 2020. Doi: 10.1158/2159-8290.CD-20-0657
2. Kindig D, Stoddart G. What is population health? Am J Public Health. 2003; 93(3): 380-3. Doi: 10.2105/ajph.93.3.380.
3. Yang Z, Zeng Z, Wang K, Wong SS, Liang W, Zanin M, et al. Modified SEIR and AI prediction of the epidemics trend of COVID-19 in China under public health interventions. J Thorac Dis. 2020; 12(3): 165-174. Doi:10.21037/jtd.2020.02.64
4. Davenport T, Kalakota R. The potential for artificial intelligence in healthcare. Future Healthc J. 2019; 6(2): 94-8. Doi:10.7861/futurehosp.6-2-94

5. Schuller D, Schuller B. The age of artificial emotional intelligence. Computer. 2018; 51(9). 38-46. Doi: 10.1109/MC.2018.3620963

Case study: In response to the emerging crisis, the author has collaborated with an ICT stakeholder to develop an AI based application which is described here to show case how AI can make a difference in such situations and why it is important to engage with it to face the predicted second and third waves of COVID-19 infection.

Introducing COVIDCHK BOT: https://covidchk.iplayxyz.com

An AI algorithm-based bot that enables the users to input certain key health data points enables to give a risk stratification to the individual as low, medium or high risk for being infected by COVID-19 virus. This is based upon the emerging data from Lancet study on the Wuhan reported cases. Subsequently, published data was constantly reviewed to update the vectors in the app. There is an additional function of symptom diary carding as well as contact logging. These functions were embedded in response to the huge gap in current practice of not knowing which symptoms are collectively emerging in a population as well as to know exactly when the advocated self-isolation starts to predict when the person will be safe to come out of isolation. It also serves as a great digital companion to individuals for up to date valid information on the disease footprint and recommendations while in self-isolation. It is linked with a tele-health portal to enable the individual to be connected to a clinician who is registered for this service or a population health link portal. This AI based digital solution has been taken up by stakeholders in the Caribbean population to introduce a holistic digital healthcare eco-system. The point here is the speed of products coming into practice from an idea to full implementation. This project took a mere three weeks to have the first prototype out. This is a reflection of how a crisis enables individuals and organizations to overcome the common barriers to reach effective solutions in time