Original article

Catastrophic COVID-19 Second Wave in Aligarh: Lessons learnt

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Abstract

The second wave of COVID-19 in India showed its devastated effect mainly in April-May 2021 and crumbled the whole health care infrastructure. Demand for medical oxygen was higher during the second wave of COVID-19 pandemic in comparison to the first spell. Three states viz Maharashtra, Uttar Pradesh and Delhi were more severely affected. Aligarh, a small district of around 1.8 million population lies in the state of Uttar Pradesh (UP). The district is famous as 'Oxford of the East' due to large number of intellectuals and teachers living and working at Aligarh Muslim University, was obviously not left unsaved in this second wave. The present paper discussed the catastrophic effect of COVID-19 second wave in Aligarh, the possible reasons behind it, preparation for the anticipated third wave and lessons learnt from the past experience.

Keywords: Second Wave Covid-19; Third Wave Covid-19; Aligarh Muslim University

Introduction

The second wave of COVID in India began in April 2021 and crumbled the health care infrastructure. The per day death toll as reported officially rose to 4,194 with more than 400,000 infections a day in early May; though many experts believed that it was gross under representation of actual data. The three major states affected were Maharashtra, Uttar Pradesh and Delhi. Uttar Pradesh (UP) was severely hit this time as compared to the first wave in 2020. Some districts of UP state like Lucknow, Kanpur, Varanasi and Prayagraj were the hotbeds of COVID-19 transmission. In Western UP, three districts Agra, Meerut and Aligarh were also at the nadir of the COVID devastation. The situation was so grim that 56 out of 75 districts of UP had more than 100 active cases.[1]

Moreover, in the second wave there was COVID surge in rural areas which was somewhat unscathed in the first wave. The rise in COVID cases in rural villages may be attributed to poor health care infrastructure, close constricted dwellings, under reporting and inappropriate COVID behvariour. Lakhs of migrants returning to these areas from metros and big cities could be another strong reason especially after the first phase of COVID-19 lockdown. Experts believe that 65% of these cases may be attributed to the Panchayat polls which were going on full swing during the second wave leading to 120% increase in cases within a month. Thousands of teachers and officers deputed in this poll exercise died due to COVID during this period. Likewise, people returning from Haridwar after participating in holy dip in Ganga River during Kumbh festival reportedly were responsible for increased disease transmission[1].

The death toll in UP had crossed the 20,000 mark by May 2021, however several experts believed that the numbers were much more than officially available

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due to under-reporting of the cases. In addition to this, there was quite a mismatch between death toll and number of reported deaths as mortuaries and graveyards were overloaded with corpses for their last rites and unclaimed bodies thrown to holy rivers that sent a very gloomy picture from top to bottom. The health care infrastructure crumbled under the second wave with acute shortage of beds and oxygen in the hospitals[1].

Catastrophic COVID second wave in Aligarh

Aligarh is a district in Western Uttar Pradesh. It shares borders with districts and is in the vicinity of Delhi and National Capital Region (NCR). It has a tertiary care hospital namely Jawaharlal Nehru Medical College Hospital (JNMCH) under the direct control of the old and prestigious Aligarh Muslim University. JNMCH is a Level 3 Government medical facility. It caters to several districts of Western UP. In the first wave JNMC had a better recovery rate of 71.9% COVID than national average of 56%[2].

Surprisingly, the situation in the second wave was completely different and gloomy. The disease was very severe and the mortality rate was much higher. Hundreds of death occurred in Aligarh district including 56 employees of the Aligarh Muslim University (AMU) within a span of just two month April-May. Out of 56 deaths, the female: male ratio was 23:33; mean age was 51-59 years and rural: urban ratio was 25:31. All these deceased were also found unvaccinated and tested either positive RTPCR or positive antigen.

Some new variant was suspected causing the severity of the disease and death. Taking cognizance, the Vice Chancellor of the University, Prof Tariq Mansoor wrote to the Indian Council of Medical Research for genomic study of the Aligarh Variant! The genome sequencing at CSIR- Institute of Genomics and Integrative Biology did not find any new strain but a double mutant of the Corona Virus prevalent elsewhere[3,4].

Some reasons of Catastrophic COVID second wave in Aligarh

Aligarh is a densely populated area and is visited by people from all parts of India. This puts it at increased risk of disease transmission. Before the second wave hit, Aligarh in the month of January - February 2021 witnessed a grand organization of an exhibition on trade and agriculture by the district administration, which could be responsible for the huge surge of COVID cases and subsequent

deaths[5]. Moreover, people were not following the COVID appropriate behavior and in rural areas there were Panchayat election polls going on in full swing. These all factors might have contributed to the second wave of devastation. People also died due to lack of oxygen supply in district and JNMC hospitals. However, JNMC authorities denied that no person in the medical college hospital died due to shortage of oxygen. In addition, JNMC Hospital was given a phase 3 trial of Covaxin, an indigenous COVID-19 vaccine by Bharat Biotech. The same vaccine showed high efficacy against COVID-19 infections in phase 3 trials all over India and was available for vaccination for all health workers of JNMC. Somehow, Covishield, another vaccine by AztraZeneca, was approved almost at the same time. In this mayhem confusion of better efficacious vaccine among the two, majority of the AMU staff members remained unvaccinated during the peak of second wave and showed hesitancy.

Anticipated third wave in Aligarh and major steps taken

Experts have warned India could face a third wave of infections in coming months. In this direction, Aligarh Muslim University (AMU) ramped up the facilities at the JNMCH for the anticipated third COVID wave. JNMCH has now a dedicated COVID ICU and COVID ward where 60 out of 100 beds are connected to oxygen panels and the paediatric ICU with 50 oxygen connected beds along with newly installed high capacity Oxygen Generation Plants.

Since medical oxygen has become an important commodity in the fight against the COVID pandemic, the hospital administration has created the infrastructure that would meet the needs in case of resurgence in COVID infections. With the increased number of beds in ICUs connected with the oxygen supplies, the hospital administration made sure that no COVID patient dies of the shortage of oxygen. The administration has further focused on increasing beds with installed oxygen supply panels in the paediatric ICU and other facilities at the Paediatric High Dependency Units (HDUs) as experts are alarmed that the third wave might affect the children more adversely. A dedicated ICU with 15 beds connected to the oxygen panels and two isolation beds within the ICU for COVID infected pregnant women are now fully functional. Even the step-down wards have beds connected with direct oxygen supply. The installation of the oxygen plant has reduced the dependency on liquid oxygen and made the hospital

self-sufficient to directly connect ICU and COVID ward beds with oxygen supply. Earlier in June 2021, a high capacity Oxygen Generation Plant imported from Germany, capable of producing 874 litres of oxygen per minute to cater to 250 patients at a time was inaugurated by the Vice Chancellor at the Trauma Centre of JNMCH. The unit has two Pressure Swing Adsorption (PSA) oxygen generators, two compressors and one air tank with the capacity of 5,500 litres and an oxygen storage tank of 3000 litres. The medical college requires 3 oxygen plants to be self-sufficient in oxygen for which the Government of India will install two plants.

Moreover, Application of artificial intelligence (AI) and machine learning (ML) in COVID-19 in patient triaging, testing and contact tracing has been used by various countries across the globe. AI is employed in clinical decision making for the various disease models. AI and ML has also been used to develop disease models using clinical, laboratory and demographic data for prognosis of severe/critical COVID patients employing survival and cox-multivariate analysis. ML and AI can help in contact tracing of infected COVID-19 patients with digital contact tracing process using smart phone applications employing various technologies like Global Positioning System (GPS), Bluetooth, Social graph, mobile tracking data, network bases-API (application programming interface) methods. The digital contact tracing is quick and gives real time data. These digital apps gather individual personal data and are further analysed using MI and AI models to trace a person who has been in contact with an infected person and predict the disease and infectivity. However, there is a flip side attached to contact tracing as they may violate privacy data. AI and ML has greatly improvised screening, prediction, contact tracing, forecasting, diagnosis, drug and vaccine development process using novel and uncharted pathways and models to control COVID -19 pandemic with minimal human interventions.[6,7]

In India, *Arogya setu app* has been developed by the National Informatics Centre (NIC), Ministry of Electronics and Information Technology, New Delhi. It is a tracking *app* which uses smart phone GPS and Bluetooth. This app has more than 100 million downloads and is used in contact tracing, identifying COVID hot spot zones. It also shares advisories and best practices for appropriate COVID behavior. *Arogya setu* app has been applauded by the World health Organization (WHO) in helping health departments to identify COVID clusters. This *app* is based on an API platform so the data collected by it may be accessed through computer programmes, mobile applications and web services. It has four sections;

1. User Status (predicts the risk of COVID-19 infection to the user);

2. Self-Assessment (Identifies COVID-19 symptoms and risk profile of the user);

3. COVID-19 updates (Updates about local and National COVID-19 cases);

4. E-pass integration (Also gives E-pass to users).

This application helps in identifying COVID-19 infection zones within the radius of 500m, 1 Km, 5 Km and 10 Km from the user and also alerts user about any COVID-19 infected person within six feets.[8] Both AMU and District administrations may make this *app* compulsorily available in all citizens' mobile.

Saliva may also be used as an alternative to nasopharyngeal swab (NPS). NPS is usually uncomfortable for the patients and also gives false negative results due to improper sampling. Saliva is a diagnostic fluid and COVID-19 virus is seen in saliva from the first week to weeks of infection. Saliva can be self collected by the patient in sterile plastic vials at home. This gives advantage over NPS which is sometimes painful and requires staff and logistics for its collections.[9,10,11]

Additionally, we need to optimize all our health care resources to tackle the upcoming third and subsequent COVID waves. The COVID appropriate behavior should be deeply ingrained in every stakeholder without an iota of complacency. Every stakeholder from healthcare professionals, political and religious leaders should be the torch bearers for the masses. The government should come up with economic and health care packages to support people who have lost their lives and livelihood.

Lessons learnt

Even after all precautionary measures to fight against ensuing pandemic, the following lessons may be learnt from the second wave:[12]

1. COVID is here to stay and COVID appropriate behavior and personal hygiene should be integrated with utmost sincerity and responsibility.

2. Motivate and inspire everyone to get vaccinated

as soon as possible.

3. Avoid crowded and confined spaces as these are the foci of disease transmission.

4. Educate others to avoid disease by improvising day to day activities in sync with COVID appropriate behavior.

5. Educate financial planning to lower socio economic groups to get financial support and freedom.

6. Starting innovative business models in sync with appropriate COVID behavior to end economic suffering and loss.

7. Medical research should focus on innovative diagnostic tests, treatment and vaccine development to thwart the third and subsequent COVID waves.

8. Accept the new normal phenomenon in teaching all disciplines including medicine through online classes, consulting patients through telemedicine and e-consultation.

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