

**Original article:**

**Patients' case scenario as well as approaches and strategies adopted to manage COVID-19 pandemic at Aligarh Muslim University, Aligarh, India**

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**Abstract:**

Corona virus Disease 2019 (COVID-19) is a severe acute respiratory infection caused by corona virus-2 (SARS-CoV-2). It originated from Wuhan city of China in December 2019 and spread like a wild fire to the entire globe and was declared as global pandemic by WHO on March 11, 2020. With no available cure and vaccine, this disease has taken a mammoth toll on the human life; therefore, SMS ('Social Distancing', use of 'Mask' and regular hand washing with 'Soap') has emerged as a sole tool to prevent its spread. The Indian government declared the first lockdown from March 25th 2020 with subsequent second, third and fourth lockdowns up to 31st March 2020 to decrease the disease transmission and flatten the disease transmission curve. Aligarh Muslim University is one of the prestigious central and residential universities in India. It is located in Aligarh district adjoining national capital region. The university has an attached tertiary care 'Jawaharlal Nehru Medical College Hospital'. This narrative review discusses the various steps and procedures taken up by the university and hospital administration, other functionaries, faculty members and doctors in tackling the serious pandemic until 22nd June 2020. The proactive role of administration, dedication and hard work of health care professionals and innovation of some academicians has given a new vista of opportunities to tackle this global health pandemic. The recovery rate of coronavirus patients at AMU hospital is recorded as 71.9%, which is much higher than national average recovery rate (56%). Thus, AMU model gives some positive insights to fight the current global pandemic.

**Keywords:** COVID-19, Pandemic, Healthcare, Innovation, Academia

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**Recommendation:**

This narrative review discusses various steps taken by the university administration, health care professionals and academicians in planning, innovating and implementing various preventive and corrective measures in tackling the COVID 19 infection which has led to better health care outcomes with improved cure rates and reduced mortality than national average.

**Background**

A novel coronavirus named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which emerged in Wuhan City, Hubei province in China in December 2019, had spread rapidly to most regions

of the world killing thousands of people.<sup>1</sup> The current outbreak termed Coronavirus Disease 2019 (COVID-19) was officially declared a pandemic by the World Health Organization (WHO) on March 11, 2020.<sup>2</sup> With no effective drug therapy available for the COVID-19 infection at present and vaccine development taking its own time, social distancing has emerged as a logical practice to prevent the spread of the disease. Many countries have been locked down partially or completely in an urgent effort to contain the spread. The Indian Government issued an order for complete lockdown of the country for a period of 21 days with effect from 25 March, 2020. The lockdown 2 was further extended till 3rd May, 2020<sup>3</sup>, then 17th

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May (lockdown 3) and 31st May (lockdown 4). In this unique global pandemic situation, the services for non-emergency health issues, usually taken care of by outpatient department (OPD) consultations and elective surgeries, were mostly suspended. Majority of the private dispensaries were also closed. The chemist shops were open as part of the essential services.<sup>3</sup>

The OPD services are the primary portal for an individual to seek health care for diagnosis, treatment of most of the symptoms and for follow up treatment of chronic illnesses. According to a report by Ministry of Statistics and Program Implementation, Govt. of India, about 9% of rural population and 12% of urban population goes to hospitals or doctors for consultation during an average 15-day reference period.<sup>4</sup> This suggests that just in the initial lockdown period of 21 days due to COVID-19, more than 15 million patients would have visited the health care centers for their health problems (considering the total population estimate of the country in April, 2020 to be more than 1.37 billion).<sup>5</sup> These millions of people who would have otherwise visited the health care facilities in normal times, are coping with their morbidities, during this phase of temporary suspension of all non-essential OPD services and elective surgical procedures, to support the nation and the world in its fight against the pandemic spread. Almost all countries are adopting several strategies and thus taking appropriate measures to contain the spread of COVID-19 pandemic. The Indian Government also issued several guidelines through various agencies and ministries from time to time including the complete lockdown of the country with all the non-essential services, including most of the services for non-emergency health issues, being temporarily suspended.

As of 22 June 2020, the Ministry of Health and Family Welfare have confirmed a total of 174387 active cases of COVID where 237195 cured or treated (including 1 migration) and 13699 deaths in the country.<sup>6</sup> India currently has the fourth largest number of confirmed cases in the world.<sup>7</sup> India's case fatality rate is relatively lower at 3.09%, against the global 6.63% as of 20 May 2020.<sup>8</sup> The same case fatality rate, or the percentage of deaths of the total cases, has declined steadily to 2.83% from 3.3% around 45 days ago. Six cities account for around half of all reported cases in the country - Mumbai, Delhi, Ahmedabad, Chennai, Pune and Kolkata.<sup>9</sup> It would be very important to know about the effect of this unprecedented crisis on medical advice in each hospital. The present paper

discusses and reports of COVID 19 at Jawaharlal Nehru Medical College Hospital of Aligarh Muslim University, Aligarh (India) and medication practices being adopted by hospital administration for both non-COVID and COVID patients until 22nd June 2020 and innovation done by AMU faculty to prevent infection transmission on university campus.

### **Objectives**

This study aims to understand the approaches and strategies taken at a tertiary care hospital to manage pandemic for both COVID patients and the non-COVID patients attending hospital, who would have normally visited the outpatient departments (OPDs) for medical advice and what preventive measures the university administration has taken on the campus to curb the menace of COVID-19. Likewise, to know how the patients are dealt according to the status of corona positive or negative and to understand the whole scenario of morbidity and mortality faced by the University hospital.

### **Methodology**

Prospective study of the patient population attending JNMC Hospital specially "Fever Clinic" of the hospital during the current days of pandemic along with various measures, approaches and strategies adopted to manage COVID-19 pandemic at Aligarh Muslim University.

### **Statistics**

The statistical analysis to relate the different variables was not applicable to the final data obtained, so assessment and interpretation was based on the number and percentage of different types of responses.

### **Observations**

#### **[A] Strategies adopted**

The medical hospital administration formulated various committees for management of pandemic COVID-19 with clear cut assignments and duties of each committee. These 5-6 member committees are as follows: Administrative committee, Management protocol Committee, Security Team, Health Care Welfare Team, Central Laboratory Services/ Diagnostic Workshop Team, IT & Telemedicine, Public Relation Committee, Duly Roaster and Day to Day Activities Team. In addition, various advisories and recommendations were issued from the hospital administration including few from the 'Hospital Infection Control Committee'.

#### **[B] Patients' Case Scenario**

Patients of non-COVID status having only elective surgery, pregnancy related issues or any serious in nature disease are treated in the hospital as

customary. These non-COVID patients are taking advice by making phone calls or WhatsApp to doctors for confirmation to either continue or stop the drugs prescribed earlier. Providing utmost care to non-COVID patients, JNMC did not turn up any patients for admission if needed. The Department of Obstetrics and Gynaecology is still carrying out hundreds of operations including cases of pregnant women needing caesarean sections. The 'Fever Clinic' examines 40 to 50 patients every day. Despite the availability of tele-consultations, it needs no guessing to conclude that all patients are not very conversant with the facility and some diseases need regular clinical examinations.

However, COVID patients are being dealt and treated in "Isolation Ward". COVID-19 positive patient if symptomatic and having comorbidities are being admitted. The hospital since day one is categorized as Level 2 by the State and District Administrations. This set up has an exclusive COVID Ward with a central room equipped with tele-medicine facility. Apart from PPE adorned physicians and para-medical staff giving duties inside the "Isolation Ward", there is a multi-specialty team of physicians keeping in touch with all COVID patients from "Control Room" through "Telemedicine". As of June 22nd 2020, total 105 COVID positive admissions were seen in the "Isolation Ward" so far including those positive cases from other districts and admitted at JNMC. On average 17-18 patients remains admitted in COVID Ward and discharged after full recovery or shifted to L1 Centre after getting treated.

All patients in "Isolation Ward" are being treated symptomatically along with the recommended regimens depend on age, severity of respiratory distress, comorbidities and organ failure compromised status. The pharmacotherapies given are hydroxychloroquine, chloroquine, antiretroviral (Kaletra), erythromycin, azithromycin, and clarithromycin for assumed prophylactic therapy against COVID-19 infection. The complete standard treatment guideline (STG) is as follows: Vitamin C 1000 mg per day plus Zinc 50 mg per day plus Tab HCQ 400 mg BD for day 1, followed by 400 mg OD for 4 days plus Tab. Azithromycin 500 mg OD for 5 days. If HCQ plus Azee is contraindicated, then Cap Doxy for 5 days plus Tab Ivermectin for 3 days were prescribed. Drop in spo2 was mostly seen in day 8 to 10 of illness.

It's a huge responsibility on the hospital administration for screening patients for COVID status. The hospital has three RT-PCR set-up and screening around 500-

600 samples a day. The Medical College continues to conduct free-of-cost coronavirus tests and so far 596 cases (22 June 2020) have been found positive out of 22346 samples that referred from Aligarh and nearby cities like Mathura, Noida, Agra, Hathras, Bulandshahr, Moradabad, Rampur, Kasganj and Etah. The figure 1 shows the most hotspot area of Aligarh City.



Figure 1: The most hotspot area of Aligarh City

On 21 June 2020 itself, 1297 samples were tested by the hospital lab out of which 11 came positive. Similarly, on the same day, 42 follow up samples of previously positive persons turned up negative in 40 patients. All these data are found uploaded on the government website. The other challenges and issues that the hospital is facing are related to duty roster chart of consultants for both Flu OPD and Isolation Ward, change of guidelines and revised protocols (District, State and National), mortal remains of patients shifted out of isolation ward, dealing sometimes with VIP patients, patients on dialysis, medico legal cases (MLC), patients load at triage, CT scan and portable X ray in isolation ward.

The patients who died in a COVID status are sent to hospital mortuary and are disposed of as per government guidelines. Total 22 people are reported died due to COVID-19 at Aligarh as of now and has been reported to both UP Government and WHO unit of Aligarh (see following table 1). At one point of time, the JNMC mortuary was full with both COVID-19 and non-COVID deceased patients and there was no space in mortuary. Similarly, there was once a time, when 40 patients (both COVID and non-COVID) were lying in the triage which normally had a capacity of 24 beds.

**Table 1: List of Deceased/Death due to COVID 19 at Aligarh District**

S. No.	Date	Age	Gender	Occupation
1	21 April	55	Male	Meat business
2	5 May	45	Female	Housewife
3	9 May	60	Female	Housewife
4	12 May	65	Male	Goldsmith
5	12 May	53	Female	Housewife
6	14 May	47	Male	Chemist
7	14 May	68	Male	Scrap Dealer
8	17 May	56	Male	Hardware business
9	18 May	55	Male	Scrap Dealer
10	22 May	60	Female	Housewife
11	22 May	50	Male	Sweet Shop
12	23 May	36	Female	Housewife
13	23 May	45	Male	Businessman
14	25 May	62	Female	Housewife
15	26 May	46	Female	Housewife
16	30 May	27	Male	Businessman
17	31 May	50	Male	Unani Physician
18	9 June	1	Female	Infancy
19	10 June	72	Male	Retired
20	15 June	16	Male	Student
21	19 June	51	Male	Retired
22	21 June	45	Female	Housewife

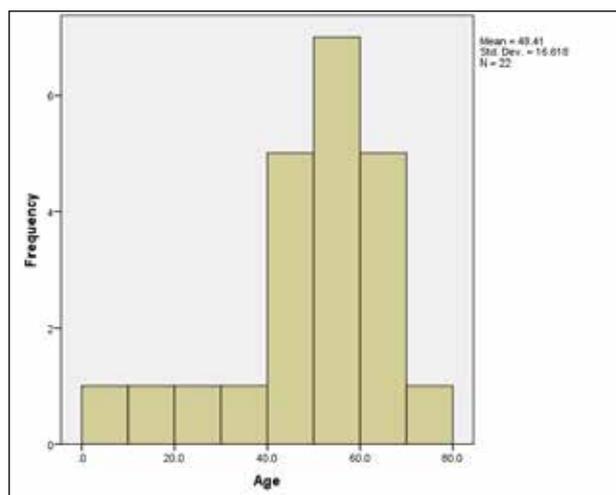


Figure 3: Histogram showing frequency of deceased COVID-19 positive patients in various age groups reported at JNMC, AMU, Aligarh

**[C] Successful Approaches Adopted**

Even as hospitals all over the country exclusively focus on tackling the coronavirus outbreak; the Jawaharlal Nehru Medical College of Aligarh Muslim University makes sustained efforts to ensure that patients suffering from other health issues do not remain at the receiving end amid the nationwide lockdown, while ensuring that COVID patients are treated properly.

The hospital continues to conduct free-of-cost coronavirus tests. Health professionals are working long hours attending to a number of infected people through telemedicine. Doctors are consulting patients through phone calls, video calls, WhatsApp messages and emails. Various clinical departments of J. N. Medical College, A. K. Tibbiya College and Dr. Z. A. Dental College have also launched e-consultation and telemedicine facilities for Non-COVID patients since the outbreak of the virus.

The hospital maintained decent recovery rate. On 22nd June 2020, it reached a remarkable breakthrough with a 71.9 percent recovery rate of coronavirus patients, which is 15.9 percent higher than the national recovery rate of 56 percent. JNMC also recorded a marked rise in the successful treatment of COVID-19 patients by reaching 71.9 percent from 57.68 per cent on June 18, 2020. So far, 56 out of 105 patients have been discharged after successful recoveries. A considerably high recovery rate at JNMC came at a time when the Union Government declared that 56 percent COVID patients have been cured all over the country. This data included 2 JNMC physicians and 4 resident doctors who were discharged after successfully recovering from coronavirus. A minor

Among the dead persons, 9 were females and 13 were males (Figure 2). Similarly, the range of maximum died patients were in the age group of 45 to 55 years (Figure 3)

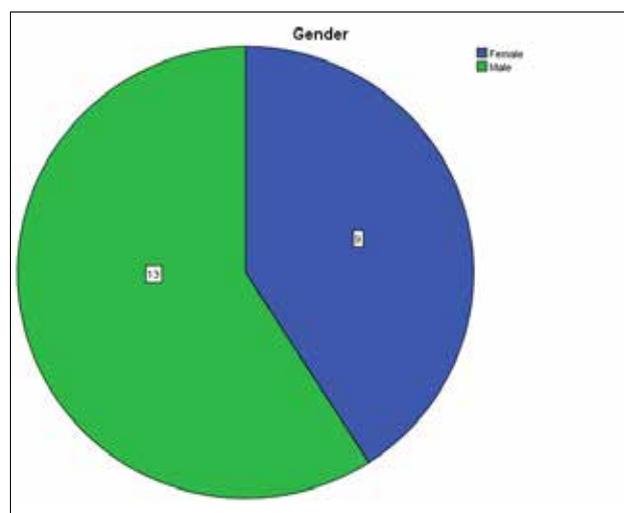


Figure 2: Pie-chart diagram showing gender wise mortality of COVID-19 patient reported at JNMC, AMU, Aligarh

child has also recovered and discharged.

While this is an applauding attempt of the hard work of health workers in JNMC, and the strenuous efforts of doctors and nursing staff behind the good recovery rate, however, caution must be maintained as the abnormal spike in new cases lately threatens to undermine the Country's efforts. The hospital in all possibility, made sure that the difference between new cases and recoveries does not rise by the day, it is imperative that all Government of India guidelines on various precautions to curb the spread are followed properly and strictly.

A full-term pregnant woman, grappling with life and death after testing positive for COVID-19 underwent Caesarean delivery at the Medical College Hospital and the efforts of doctors bore fruits and a baby girl was born. She was refused admission to some hospitals before a frontline hospital of western UP, JNMC came to her rescue. She recovered with healthy newborn. She undergone required surgery due to obstetrics reasons. The patient, suffering with Pregnancy Induced Hypertension, was immediately taken into the COVID-19 isolation complex Operation Theatre (OT), where she was operated by the consultant gynaecologists and obstetricians. According to attending consultant neonatologists the baby girl weighing three KGs and her mother were safe and doctors took all steps to see that the child did not contract coronavirus.

#### **[D] Innovation at AMU**

Several young enthusiastic faculties in medicine have collaborated with their peers in engineering faculty and have come up with some innovative and frugal solutions for prevention of COVID-19 transmission. Just as an example, a faculty in Anesthesiology Department has collaborated with another faculty in the Mechanical Engineering Department and has come up with an innovative "Protection Box" which is used to shield doctors, nurses and paramedical staff during intubation procedure. This protection box now is being used routinely to prevent infection transmission during intubation procedure where patient usually coughs and there is greater risk of viral transmission. These protection boxes are handy and have excellent visibility and can be disinfected for repeated use. This economical innovative solution on shoe string budget has been enthusiastically received by the medical fraternity. This innovative Protection Box can also be utilized with modifications as an adjunct to personal protective barriers in other specialties like Dental surgery and ENT where the clinician is in very close contact to the patients and

are at very high risk of viral transmission as surgical procedures particularly in dentistry are aerosol and debris generating which are potential source of infections.<sup>[10]</sup>

#### **[E] Preventive Measures and Social Distancing at AMU**

Aligarh Muslim University is a residential university. After a brief relaxation of Lockdown 1.0, students were asked to better evacuate the hostels and leave to their home. The university arranged specially trains and buses after consultation and fool-proof planning respectively with the Ministry of Railway and Ministry of Road Transport and Highways. These students, both boys and girls, left the university in phases and reached their homes safely to different states of India.

The university has also arranged certain areas for quarantine for the students after their return to halls of residence. As per the instruction of the registrar of AMU, Moniuddin Hostel and Hostel of UGC HRD Centre has been converted into quarantine facilities to brace up for the predicted peaking of COVID-19 infection. The decision is taken on the recommendations of a committee constituted by the Vice-Chancellor. While Moniuddin Hostel, an annexe of S N Hall is declared a quarantine facility for female students; the Hostel of UGC HRD Centre would be used for isolating male students exposed to the infection. The Provost of S. N. Hall and the Director, UGC HRD Centre has been appointed as the in-charge of Moinuddin Hostel and UGC HRD Centre quarantine facilities respectively. The Director, Medical Attendance Scheme (MAS) would be the in-charge of the team of doctors at the Moinuddin Hostel facility, whereas the In-charge of University Health Service would lead the team at the UGC HRD Centre facility. "The medical in-charges of both quarantine facilities would prepare duty rosters for doctors and the nursing staff and paramedical staff and would ensure the availability of medicines. Further JNMC Medical Superintendent and University Health Officer could also be contacted on need basis. Registrar further informed that Bibi Fatima Hall and Annexe of Dr. B. R. Ambedkar Hall would also be converted into quarantine centres for girls and boys respectively as the University opens. However, these facilities would be used when there is no space left for patients in the Moniuddin Hostel and UGC HRD Centre quarantine facilities. Students residing in the Bibi Fatima Hall would be shifted to Begum Azezun Nisa Hall, while residents of the Annexe of Dr. B R Ambedkar Hall would shift to

Dr. B. R. Ambedkar Hall. Dean Students' Welfare is responsible for taking necessary steps for shifting students. The committee has further recommended to immediately admitting Covid-19 positive students residing in University hostels to JNMC, while shifting the roommates of infected students to quarantine centres. It has been decided that the wing of the hostel, where the COVID positive students if found would be marked as a containment zone on Government of India guidelines.

AMU is strictly following social distancing norms. Thermal scanning of all visitors has been done at the main gates of all residential hostels and halls. Meanwhile, University employees suffering coronavirus has been asked to self-quarantine after undergoing treatment. They would be quarantined at the University Health Service in case of showing reluctance to self-isolate at home for specific reasons. University Health Officer, Director of MAS and Principal, A. K. Tibbiya College would conduct regular health checkups of employees.

In a bid to prevent employees, students and visitors from contracting coronavirus; the university has installed automated mist based sanitiser dispensers, sanitisers with paddle stands and wall hanging contactless temperature scanners at various entry points of the university. Contactless temperature scanners have also been given to the guards deployed at different university gates to check temperatures of all visitors. Four DRDO developed automated mist based sanitiser dispensers have been installed and provided at the main entrance gate of the Administrative Block Building; the Vice Chancellor's Office, Registrar/Finance Office, Public Relations Office and Admission Section with these dispensers. Paddle based sanitiser dispensers have been positioned at the Property Office, CPO and Service Book Sections and two wall hanging contactless temperature scanners (infrared forehead thermometers) are also placed at the main entrance gate of the Administrative Block while 30 contactless temperature scanners (infrared forehead thermometers) are provided to various mosques in campus premises, One contactless temperature scanner each has also been given to the gallery of the Registrar/ Finance /Office, Public Relations Office, Property Office, Admission Section, CPO and Reserve at Caretaker for any emergency.

### **Discussion**

In normal times self-medication and misuse of modern medicines is a very common global problem.<sup>11</sup> The problem is even more in developing

countries where the drugs which should be available only with prescription are easily available as over the counter drugs. Studies report that in India, the prevalence of self-medication in patients, ranges from 30% to as high as 70%.<sup>12</sup> It is observed that absence of any such practise in this pandemic could not only have been due to the seemingly larger concern of the pandemic taking over other physical concerns. It could also have been due to strict enforcement of the lockdown by the police agencies verifying the seriousness of the need of people venturing out. The provisions of imposing heavy fines and even a jail-term as punishment to defaulters, to ensure the compliance of lockdown rules strictly, may have worked as a deterrent for patients with mild to moderate morbidities seeking to go out to a chemist shop unless they had proper prescription.<sup>13</sup>

Hydroxychloroquine is one of the drugs being tried as prophylaxis and management of COVID infection.<sup>14</sup> As per the Government of India advisory to prevent misuse of the drug as a prophylactic agent, it has been recommended to be used only by health care professionals in the hospital taking care of suspected or confirmed COVID-19 cases or by contacts of confirmed cases<sup>15</sup>. Non-COVID patients are not found to be taken HCQ which could have been due to the lockdown and unavailability of hydroxychloroquine in most chemist shops.<sup>16</sup>

Because of the successful treatment strategies, approaches and preventive measures at JNMC Hospital, the AMU sought Level 3 hospital status. The Vice-chancellor urged Chief-minister of Uttar Pradesh to grant COVID-19 Level-3 Hospital status to the University's Jawaharlal Nehru Medical College Hospital. In a letter to the Chief-minister, the Vice-chancellor said that JNMC Hospital fulfills all requirements for Level-3 Hospital and its elevation would immensely benefit the patients of Aligarh division. The Vice-chancellor further stated that the JNMC Hospital's COVID-19 ward consists of 80 beds and ten ventilators, with central Oxygen supply to the 'Isolation Ward'. AMU has purchased one RT-PCR Machine for testing of COVID-19 patients as well as placed order for four new ventilators costing Rs. 70 Lacs. The university also placed a separate order for a Dialysis machine. This separate dialysis facility would help further the renal compromised COVID-19 patients. He informed to the Chief-minister that the JNMC Hospital has separate COVID-19 Operation Theatre and Labour Room and the funds, spent on the management of patients and

equipment on this front, has been arranged by the university from its own resources.<sup>17</sup>

### **Conclusion**

Most of the people with medical conditions, confined at home due to national lockdown, are coping with their problems or contacting their physicians via telephone or WhatsApp. Since the non-Covid patients are going through a lot of hardships, the JNMC hospital administration wants to make sure that they do not fall short of essential health care. COVID patients are treated appropriately in the "Isolation Ward". It is very heartening to see such a level of dedication in these times when people are letting go of their civic duties to the "living". The efforts of JNMC hospital are an inspiration. The dead bodies are being dealt with respect and avoid any mishappening or incidents where two bodies got exchanged and wrongly cremated or buried. In this regard, there is a good coordination between JNMC Hospital and District administration where authorities trying to ensure presence of both civil and police while dead bodies are being released

for cremation. Moreover, the out of box innovative frugal solution developed by AMU teaching faculty has opened new vistas of possibilities to deal with this pandemic.

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### **Contribution of Authors:**

Syed Ziaur Rahman: Concept and design of study, acquisition of data, manuscript preparation and revision of the manuscript critically for intellectual content.

Saif Khan: Manuscript preparation and revision of manuscript critically for intellectual content, acquisition and statistical analysis of data.

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