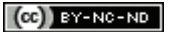


Challenges in Delivering Optimal Healthcare to COVID-19 Patients: Focus on Delhi, India

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INTRODUCTION

The public health scenario in India is grim. It is an open secret that India doesn't spend adequate public money on healthcare. Interestingly, the public sector health expenditure is only 25%, compared to 75% in case of the private sector. In case of other countries, the public sector bears 50% of the total health expenditure.

The Government of India's healthcare budget is deplorable, which currently stands at a meagre 1.15-1.5% of the Gross Domestic Product (GDP). In stark contrast, the United States health budget accounts for 18% of the GDP. Looking at the National Health Profile of India (2018), it is clearly evident that the per capita expenditure on healthcare is only USD 100 (after adjusting for purchasing power parity). In comparison, the US spends a staggering USD 10,224 per capita on healthcare annually. This dismal health spending in India has led to a severely weakened health system that is literally crippled and incapacitated [1].

When the current COVID-19 crisis is superimposed on the already fragile health infrastructure, one can easily imagine the immense strain that has been put on the health system as a whole. This is reflected in the available statistics for India on the prevailing pandemic. At the time of writing (28 August 2020; 11.00 AM IST), the total number of cases and deaths in India were 3,325,971 and 61,529 respectively. The corresponding figures for Delhi were 150,027 and 4,369 respectively. Importantly, Delhi is currently the sixth worst affected state in India, following Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, and Uttar Pradesh [2].

DELHI GOVERNMENT'S STRATEGY FOR TACKLING COVID-19

The Delhi Government has planned a 5-pronged approach [3] to tackle the COVID-19 crisis in Delhi, which are briefly highlighted below:

- **Ramping-up bed capacity:** The number of beds dedicated to COVID-19 patients have been ramped-up in Delhi over the past two months. In this initiative, banquet halls, hotels and private nursing homes are being acquired to boost the bed capacity in the National Capital. These include 11,000 beds in 80 banquet halls, 4,000 beds in 40 hotels, and 5,000 beds in private nursing homes [4]. In this regard, 117 private hospitals have been instructed to reserve 20% of beds for COVID-19 patients [5]. Additionally, 500 railway coaches have also been allocated to the Delhi Government by the Central Government, which has added a further 8,000 beds [6]. Besides these, the Central Government and Delhi Government have jointly inaugurated the Sardar Patel COVID Care Centre and Hospital at the Radha Soami Satsang Beas, Chhatarpur, New Delhi on 27 June 2020. This COVID-19 centre is the world's largest, with a bed capacity of 10,000 [7]. However, since almost 78% of beds dedicated to COVID-19 patients are currently lying vacant [8], the Delhi Government is thinking of delinking the hotels from the hospitals [9].

- **Testing and isolation:** Currently, large-scale COVID-19 testing is being carried out across Delhi. Delhi is currently conducting the third-highest number of tests in the country, only after Assam and Andhra Pradesh. The exact number is 7,210 tests per million per day [10]. Moreover, around 600,000 test kits have been acquired by the Delhi Government so that testing is not hampered [3].
- **Serosurvey and screening:** A comprehensive house-to-house serological survey is being conducted in Delhi, which has a target sample size of 20,000. This will help to screen for potentially infected COVID-19 patients, as well as develop a better understanding of recent and past infections by measuring the levels of IgM and IgG antibodies, respectively [3].
- **Oximeters, oxygen and oxygen concentrators:** One of the cardinal features of COVID-19 is a sudden drop in blood oxygen levels. Hence, close monitoring of the oxygen level of blood is crucial for preventing breathing problems. For this purpose, pulse-oximeters are vital, which are being supplied by the Delhi Government to all home quarantined COVID-19 patients [11]. Also, oxygen cylinders can be ordered by home quarantined COVID-19 patients via telephone, in order to increase convenience and efficiency [12]. The Delhi Government has procured 4,000 oxygen concentrators in order to ensure that sufficient oxygen cylinders are available [13].
- **Plasma therapy:** Administration of plasma from cured convalescent patients have shown significant benefit in saving the lives of active COVID-19 patients. The Lok Nayak Jai Prakash (LNJP) Hospital in New Delhi has reported a reduction in the death rate by more than 50%. Other hospitals in Delhi that are conducting plasma therapy trials include the All India Institute of Medical Sciences (AIIMS), Ram Manohar Lohia (RML) Hospital and five prominent private hospitals [14].

CHALLENGES IN HEALTHCARE DELIVERY

Disparities in Healthcare Personnel in India [15]

Of the various categories of healthcare professionals in India, doctors and nurses make up 39.6% and 30.5% respectively, of the total health workforce. Of all the doctors, 77.2% are allopathic, while 22.8% fall under the category of AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homoeopathy), which constitute the traditional systems of Indian medicine.

There are significant disparities in the distribution of healthcare professionals across the country. The majority of healthcare professionals prefer to work in urban areas, with an urban to rural ratio of 1.45:1. In fact, it is quite surprising that of all health workers, 59.2% work in urban areas, where only 27.8% of the population resides, while 40.8% work in rural areas, where the majority (72.2%) of the population resides. There are also large variations in doctor density across India. For example, the high-income state of Punjab has 2.6 times higher doctor density than Bihar, which belongs to the low-income strata. The urban-rural divide is also evident in the

educational attainments of the doctors. Many doctors do not hold the requisite degree (MBBS) for practicing allopathic medicine. In fact, one third of so-called doctors (quacks) are only educated till the secondary level. This lack of medical qualification is particularly rampant in rural areas. Whereas in urban areas, 58% of doctors have a medical degree, in rural areas this value is only 19%.

Severe Shortage of Doctors and Nurses in India [16]

The Centre for Disease Dynamics, Economics and Policy (CDDEP), which is a non-profit organisation based in Washington, USA, has recently conducted a study assessing the shortage of key healthcare personnel in India. Alarming, the study found that in India, there is only one government doctor for every 10,189 people, as opposed to the World Health Organisation (WHO) recommended doctor to patient ratio of 1:1,000. This translates into a deficit of approximately 600,000 doctors in India. The nurse to patient ratio is equally appalling at 1:483, which translates into a shortage of two million nurses. Putting these statistics into perspective with reference to the COVID-19 pandemic, the already low number of doctors and nurses could become even lower, as many of these key frontline health personnel are becoming infected by the virus, thereby putting them out of action.

Shortfall of Doctors and Paramedical Staff in Delhi

As per data published by the National Capital Region Planning Board (NCRPB), the total number of doctors in the National Capital is 3,594 (Government: 777; Private: 2,817). The total number of paramedical staff (including nurses) in the National Capital is 23,634 (Government: 11,469; Private: 12,165) [17]. Therefore, the current doctor to patient ratio (doctors: 3,594; confirmed COVID-19 patients: 150,027) is 1:42. However, it must be kept in mind that not all doctors can be allocated solely for treating COVID-19 patients, as a certain proportion will need to be reserved for treating regular inpatients. Hence, the above doctor to patient ratio is likely to increase drastically.

High Cost of Hospital Beds- Hidden Expenses

The Association of Healthcare Providers of India (AHPI) has indicated that a super speciality private hospital in India spends approximately 28-32% of its operational budget on maintaining a bed, which amounts to INR 15,000 to 25,000 per day. In contrast, the cost of maintaining a bed in a tertiary care government hospital is INR 9,000 to 17,000 per day [18].

Some of the hidden recurring costs that contribute to the overall expenditure for running a hospital bed are briefly highlighted below [19,20]:

- **Employee and staff salaries:** Besides salaries for key medical personnel, such as doctors and nurses, salaries for other employees also need to be allocated. These include hospital administrative staff, ward boys, pharmacists, pathology/X-ray technicians, receptionists, clerks, security personnel, and sweepers, among others.
- **Building maintenance and utilities:** These include premiums for hospital insurance, electrical installations, electricity/water bills, annual maintenance charges for high-end equipment, and fire safety.
- **Medical equipment:** These form a large chunk of the expenses and include various types of fixed equipment, such as monitors, scanners/imagers, surgical instruments, operation theatre equipment and other associated paraphernalia.
- **Diagnostics and therapeutics:** These include costs towards diagnostics involving pathological and biochemical investigations, X-rays, CT scans, MRI, as well as medications and other associated therapeutics.
- **Supplies for staff and patients:** These include uniforms, aprons, surgical scrub suits, patient's gowns, and footwear, to name a few.

- **Housekeeping, linen and laundry:** Linen, such as blankets, bedsheets and pillow covers will need to be provided to all patients, which will require regular washing. Hence, an in-house laundry will be required. It is these and other housekeeping expenses that are often overlooked.
- **Power backup:** Hospitals require 24-hour power supply, which require powerful generator sets, the running costs of which don't usually come to notice.
- **Biomedical waste disposal:** Disposal of hospital waste often require substantial investment, as huge amounts of biomedical waste is generated daily. These expenses also largely go unnoticed.

Logistical Problems

Installing and running a bed in a hotel, banquet hall or railway carriage is not the same as setting-up a bed in a hospital. The major problem associated with treatment of patients outside a hospital setting is associated with logistical issues, including the following:

- **Patient transfer:** Transfer of patients in critical condition to-and-from these facilities will be a major problem, considering the fact that there are only about 817 general and 206 trauma ambulances (Government and Private combined) in the National Capital [17]. Again, similar to doctors (discussed under 'shortfall of doctors and paramedical staff in Delhi'), not all ambulances will be available exclusively for COVID-19 patients.
- **Care of critical cases:** Since transfer of patients may not always be possible, as indicated above, essential medical facilities, such as ICUs need to be installed. Also, emergency equipment, such as ventilators should be available. And of course, adequate designated medical staff will need to be at hand.
- **Patient monitoring:** Regular rounds by doctors will take up an enormous amount of time. If we take the simplistic doctor to patient ratio of 1:42 (discussed under 'shortfall of doctors and paramedical staff in Delhi') and if a doctor devotes just 10 minutes per patient, then for 42 patients, the time required for one round will be 420 minutes or 7 hours. This will deduct a huge amount of time out of a standard 8-hour shift, leaving almost no time for emergency medical treatments. Therefore, more doctors will be required- the question is, where will they come from?
- **Diagnostic testing:** Sending/tracking samples for testing could prove to be a logistical nightmare. Although rapid diagnostic kits that measure IgM and IgG levels could be used at the Point-Of-Care (POC), these tests only provide information about past infection and not current infection. For detecting current infection, the Polymerase Chain Reaction (PCR) test is currently the only option, which can only be carried out in a specialised lab, and therefore, the samples need to be physically transferred to these facilities.
- **Oxygen supply:** Supplying oxygen will be a huge problem in these facilities, unlike hospitals, where piped oxygen is available round-the-clock. Hence, supply of oxygen cylinders will require dedicated personnel. Moreover, one cylinder will need to be kept on standby while the other goes for refilling.

Sickness of Key Healthcare Personnel

A major factor that needs to be taken into consideration is- what will happen when key health personnel like doctors and nurses become infected and fall sick? In this regard, between March and June 2020, at least 1,200 doctors and nurses have tested positive for COVID-19 in Delhi [21]. A simple calculation will show the loss of work-hours due to sickness for these frontline health staff. Since 1,200 doctors and nurses tested positive, they would all need to be quarantined for at least 14 days for observation. Taking 8 hours to be the duration of a standard work shift, the total work-hours

lost is a staggering 134,400 hours (1,200×14×8=134,400 hours). Moreover, if some of them become seriously ill, they will need to be hospitalised, which will lead to more loss of work-hours. The million-dollar question is- who will replace this deficit of doctors and nurses?

CONCLUSION(S)

Delivering optimal healthcare to COVID-19 patients amidst the ongoing pandemic is indeed a challenge for healthcare professionals, especially in an overcrowded and congested metropolitan city like Delhi. There are multiple impacting factors that hinder adequate healthcare delivery, which have been discussed above. From a holistic standpoint, the root cause for the lack of pandemic preparedness in India is the chronic underinvestment in healthcare, which can be traced back to the time of independence, over seven decades ago. So, the current rush to tackle the pandemic on a war-footing could be looked upon as a stop-gap arrangement. However, ending on an optimistic note, it must be mentioned that Delhi is fighting back impressively and slowly but surely, turning the tide.

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