

# Challenges faced by the laboratory professionals during COVID-19 pandemic at tertiary care hospital, Kathmandu, Nepal

Krijan M. Vaidya<sup>1</sup>, BMLT; Bipin Nepal<sup>2</sup>, MS; Sabindra Maharjan<sup>2</sup>, BMLT; Bina Gurung<sup>1</sup>, BMLT; Ravi Mahat<sup>3</sup>, FCPS; Nabin Narayan Munankarmi<sup>4</sup>, M.Sc

<sup>1</sup>Department of Laboratory, Grande International Hospital, Kathmandu, Nepal

<sup>2</sup>Department of Transfusion Medicine, Grande International Hospital, Kathmandu, Nepal

<sup>3</sup>Department of Pulmonology, Grande International Hospital, Kathmandu, Nepal

<sup>4</sup>Central Department of Biotechnology, Tribhuvan University, Kirtipur, Nepal

## Corresponding author

**Krijan Man Vaidya, BMLT**

Email: baidya.krijan@gmail.com

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## ABSTRACT

COVID-19 pandemic has affected most sectors of health care services operations and staffs. National lockdown also negatively affected the number of OPD patients and non-essential medical services. Routine laboratory tests declined drastically during the lockdown period. Outsourced tests, quality control, reagent demand and supply, reagent, maintenance of equipment were negatively affected during the pandemic. Staff members faced immense pressure to maintain workplace safety and provide the best service with limited resources. To counter the effects of the pandemic, different strategies and policies were implemented at the department of the laboratory at Grande International Hospital. The limited laboratory workers were divided into different groups as duty shifts to reduce the chances of infection among the co-workers. In this article, we share the challenges and experiences at our work in six-month duration during the pandemic during the first lockdown enforced by the Government of Nepal.

## Introduction

Corona Virus Diseases-19 (COVID-19), first reported back in 2019 in Wuhan, China has subsequently spread worldwide and has emerged as the fifth pandemic since the flu pandemic, which was during 1918. It has been named officially as Severe Acute respiratory syndrome Corona Virus 2 (SARS-COV-2) by the International Committee on Taxonomy of Viruses based on phylogenetic Analysis<sup>1</sup>. After causing severe morbidity and mortality in most countries globally with devastating implications, it has been declared a pandemic by the World Health Organization (WHO) on 11th March, 2020<sup>2</sup>. Nepal faced a massive burden from coronavirus disease 2019 (COVID-19) after it was first reported on 13th January from a native student by visiting Nepal studying at Wuhan University of Technology<sup>3</sup>.

(COVID-19) has heavily shaken the world with its mutagenic and indigenous property causing a global threat demanding an enormous number of skilled laboratory professionals in Nepal to combat it. Series of lockdowns and travel restrictions across the country abruptly changed the general workflow of the laboratory raising many challenges. Laboratory serving as the backbone department for the health care workers from diagnosis till surveillance is considered as a critical service in tertiary care hospitals and is expected to continue 24/7 operations even during an infectious pandemic from the view of an organizational perspective<sup>4</sup>.

Unlike other laboratories in developed countries with highly advanced technologies, essential infrastructure, and financial resources, the

pandemic constitutes tremendous challenges for the laboratories in a country like Nepal. Because of its complicated pathogenesis and inadequate understanding of its risk factors by laboratory professionals, laboratory professionals were under unease pressure to organize our laboratory accordingly. During such a crisis, it becomes vital for every laboratory professional to serve dedicatedly without disrupting diagnostic services.

Laboratory professionals on one hand were under a heavy dose of contracting the infection while on the other hand having to deal with various challenges during the COVID-19 outbreak<sup>5</sup>. Ensuring safety among the laboratory staff was an ongoing challenge and on top of that, the lab had to face a certain block of hind hats which arose from various aspects and levels that were quite unpredictable<sup>10</sup>.

With the view of providing assurance for better diagnostics services during such crises, our focus of this review is to accentuate the challenges faced by the medical laboratory professionals at a tertiary care center, Grande International Hospital in Nepal. During organization and planning, professionals confronted the following challenges to make our laboratory immune and stable as before by preventing the spread of infection among laboratory personnel.

### Challenges faced on a day-to-day basis:

#### **Making availability of Personal Protective Equipment (PPE)**

PPE is more likely considered as a shield for laboratory professionals. Its protective clothing includes a face shield, masks, gloves, goggles that are designed to prevent any sort of antigens from entering inside our body acting as a barrier between infectious materials such as bacterial and viral contaminants.

To have more than 50 staff in the laboratory and regarding their safety, making the availability of PPE for all the staff has become one of our major challenges to overcome at first.

The professionals were bound to survive the undersupply environment of PPE in the laboratory for months, which made them feel so desolate to work. As the staff safety was an important concern, they thrived on reaching every source for accessing PPE.

#### **Social distancing effects**

As the cases were rising dramatically, staff were obliged to practice social distancing by limiting the number of staff in the laboratory. About half of the staff was obliged to stay home considering forced leaves in order to prevent the consequences if any staff became affected, the laboratory would still be adequately staffed. Doing double shifts to acquired duty hours was affecting work patterns and family time. Even the staff from the respective sub-departments of the laboratory were restricted to interact with the staff of other departments during the shifts.

Sometimes because of the limited staff, it became quite difficult to operate the laboratory due to sudden exacerbation in workload due to the high number of hospitalized patients which caused the possibility of samples misplacing and delay reporting. So far they realized that social distancing policies have completely jeopardized their work. They realized that this has also become one of the terrible challenges to operate a laboratory in a socially distant environment.

#### **Reagents scarcity**

Despite the decline of overall test volumes, some test parameters like Procalcitonin, CRP, D-dimer, Ferritin, LDH, Troponin, etc. mainly used for such COVID-panel tests demonstrated more demands than usual and the delivery of those reagents and consumables was critical at the time. Although all these tests were equally important for monitoring the track of COVID-19, there was a huge reagent consumption due to the extremely high influx of admitted COVID patients. They even had to purchase a new automated analyzer for running the tests of COVID inflammatory markers instead of having another analyzer for the same tests due to a shortage of reagents. As only one analyzer was sufficient before for running all those tests manually, the efficiency of Turn Around Time (TAT) for these tests was drastically reduced which resulted in the delay in reporting. As a result, samples having these tests started piling up in every shift disturbing the work patterns for the next shift in clearing those pending tests that were extremely hectic. Analyzing, reporting, and completing all those assays under a heavy sample flow environment by a limited staff at a time of reagent scarcity has also become one of the great challenges for laboratories to face.

### Impact on internal and external quality control

In a medical laboratory, quality can be defined as the accuracy, reliability, and timeliness of the reported test results. Quality control (QC) refers to those measures which should be performed mandatorily on each assay so that the test is working properly<sup>6</sup>. As the staff was running quality control on a daily basis for all clinical chemistry, immunology, and serology assays, they realized that they were of no use for some test parameters like hormone and vitamin assays as those tests were not run in high numbers as it was used to. Therefore, they made a slight change in their QC running protocol for minimal consumption of QC material. They decided to run them on alternate days, as the numbers of tests were limited. For external quality control, they have been coordinating with other centers outside the country for test verification so the validations have become disrupted. Because of this deteriorating impact on internal and external quality assessment, they failed to evaluate their laboratory performance on test competency and accuracy.

### Maintenance of laboratory equipment

Maintenance of laboratory equipment is an integral part of Quality assurance in the lab. Faced with a crisis scenario, such as COVID-19's confrontation of the pandemic, combat measures such as social isolation have been major concerns in restricting or interrupting the provision of services by companies that perform preventive maintenance services<sup>7</sup>. The services that have been provided by the biomedical engineers from the corresponding suppliers for the maintenance of laboratory equipment were discontinued. They were hardly available for the service. This had a great impact on the functioning of the laboratory. Skipped maintenance of equipment generated blocks of obstructions into its subsystems making it incapable to perform any tests. Convincing vendors to provide repair and servicing to laboratory instruments again dragged the lab professionals into a challenging situation amidst the COVID pandemic.

### Declination of test volumes

Tests volume in the laboratory dropped significantly due to the state of lockdowns raising fear among the people; many were under quarantine as the number of infected cases and death tolls were skyrocketing in Nepal. This resulted in a decreased number of outpatients in every hospital and diagnostic center across the country. This led to huge financial loss and revenue generation

targets becoming compromised for the hospitals delivering many consequences. Maximum reagents remain unused prior to other days; staff had to discard many reagents and tests, which were near the expiry date. To maintain the test's gradient, home sample collections were even started but that has not reached the peak of average test volumes compared to pre-COVID months. Some of the outgoing tests like Quantiferon TB gold for tuberculosis, Western blotting for HIV, Hepatitis B envelope antibody titer were held and canceled making it the physicians difficult to diagnose. During the first lockdown, few hospitals were reluctant to admit COVID patients for safety concerns and stopped the metastasizing of infection which was also one of the major causes of declined test volumes. Apart from this, the vital reason that was identified was infection fears among the people from visiting hospitals.

### Concise remuneration

Salaries confinement was another challenge raised by the pandemic in the hospitals. No annual increment was done on salaries for laboratory professionals despite knowing the fact that they are the ones who were deployed in such risk services for patient care. Instead of supplementing the salaries with an allowance for being exposed to COVID patients and samples, hospitals did exactly, the opposite by engraving off their salaries by half. As per an announcement of the Ministry of health and populations, they were supposed to get allowances equivalent to their salaries, which they did not receive at all. Additionally, staff appraisal forms were also canceled.

### Psychological stress

Excluding the physical risk of acquiring infection, this pandemic has set up sensational levels of psychological stress among the lab professionals working on constant infection fear of contracting the virus while isolated from the family and facing social stigmatization<sup>12</sup>. Moreover, lab professionals were more concerned about the fact of viral transmissions among the immunocompromised family members without even knowing if they are infected or not. Inadequate supplies of PPE further infuriated this stress. Social skepticism was another contributing factor to psychological distress. People living in society started showing the dark side by ignoring, hiding, creating distance, and giving unpleasant looks just by thinking that the professionals work in the lab and are viral carriers. Many laboratory staff residing on rent had to face

atrocities from their property owners. Therefore, this throbbing challenge ends up resulting in mental havoc for the health care workers.

### Amendment to existing policies

Hospitals' internal programs including seminars and conferences have been canceled and adjourned. Clinical internship programs for the medical laboratory students from different institutions were no longer permitted in the laboratory, which had a terrible impact as their course duration prolonged for a year. Transportation facilities for the staff were also made limited, which generated a significant workload for negotiating with staff, accepting management protocols, and organizing duty rosters accordingly. Staff was compromised working for sample collection disrupting duty shifts and changing workflow in the laboratory. Outsourcing of viral swabs to another molecular laboratory was common because of the instant peak in the number of samples. Staff had to face a lot of stress coordinating and conveying those reports to patients. They were not able to perform clinical testing on time properly in the laboratory due to answering heavy phone calls from the patients asking for their reports. This has created havoc in the TAT of tests across the laboratory.

### Results

COVID-19 resulted in disorganization in the laboratory sector of Nepal in many ways. Mainly reported challenges were undersupplied PPE, lack of diagnostic tools, reagents, and consumables followed by contact tracing, quarantine, and treatment. The main factor in facing those challenges was unpreparedness and lack of knowledge regarding the pandemic. The Post-COVID lab scenario drove us in a different direction functioning differently. Organizing a safe workplace represents the cornerstone of good laboratory practice and is extremely useful during such a pandemic<sup>11</sup>. In contrast, fever clinics were set up systematically applying safety protocols for sample collection particularly for those patients possessing COVID symptoms. As the disease has a primarily respiratory route of infection and close contact, patients, staff, and visitors were mandated to wear masks, hand washing along with measuring the temperature of the body with infrared thermometer temperature gun before entry to the health care center. Segregation of the laboratory samples of COVID patients was done for study and research purposes and applied spraying disinfectant to every sample received in the lab from different wards and

critical care units. Duties of staff were redefined as per safety guidelines helping in narrowing the bar of spreading infection so far. The post-COVID scenario has also established a collaboration network among lab professionals and pathologists sharing ideas and awaking each other regarding prevention and new laboratory practices. Molecular testing of viral nucleic acid was started gradually optimizing workloads as compared to the pre-COVID scenario.

### Conclusions

The challenges posed by multidimensional factors during COVID-19 have significantly stretched the resources and capabilities of laboratories.

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