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## **Role of Clinical laboratories in SARS COVID -19 pandemic: intricacy and Recompense**

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**Abstract** SARS-COVID-19 became one of the most virulent, deadly and wide-spreading disease ever witnessed in modern history. Asia, Europe, Pacific, Americas, all affected with total cases 140,849,925, cases per 1 million population 18,114 and deaths 3,013,217 as of 21<sup>st</sup> April 2021 (WHO data); whereas in Pakistan total cases 766,882; new cases 5,445; cases per 1 million 3,499; and deaths 16,453 (WHO data accessed 21<sup>st</sup> April 2021). This review covers the difficulties faced by Clinical Laboratories, lessons learned and/or advantages that we gained after facing the overall pandemic, restriction-laden, financially burdened scenarios and even the recognition received for clinical lab and its personnel in last year, unprecedented, haven't seen in last many decades.

**Keywords** SARS COVID -19, pandemic

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### **Introduction**

Year 2019 December, was the most intriguing, surprising and shocking for the whole world when we saw a mere flu like condition converting into a deadly disease and spreading from a single city Wuhan, China, to the entire world, left right and center. Tagged as COVID-19 viral infection or more specifically (severe acute respiratory syndrome) SARS-COVID-19 became one of the most virulent, deadly and wide-spreading disease ever witnessed in modern history. Asia, Europe, Pacific, Americas, all affected with total cases 140,849,925, cases per 1 million population 18,114 and deaths 3,013,217 as of 21<sup>st</sup> April 2021 (WHO data); whereas in Pakistan total cases 766,882; new cases 5,445; cases per 1 million 3,499; and deaths 16,453 (WHO data accessed 21<sup>st</sup> April 2021). Situation was and still such grave that hospital beds, Intensive Care Units (ICUs), High Dependency Units (HDUs), all became occupied, oxygen tanks became out of stock. Travel bans, flight bans and restrictions, mask, social distancing, restrictions on dine-in, cinema, hotels, parties, marriages has been enforced to control this pandemic. Mid July 2020 sees development and/or availability of RT-PCR tests for Covid-19, which was used judiciously to diagnose patients with Covid-19 viral infection and load. Its now mandatory to have a negative Covid-19 RT-PCR result to travel, hotel stay or attend high profile meetings. Making RT-PCT test mandatory and determination of bio-markers such as Ferritin, Lactate dehydrogenase, Pro-Calcitonin, Interleukin-6, D-Dimer and C-Reactive protein to assess severity of SARS-Covid infection, progression of disease and prognosis, puts extra burden on busy, time-bound, quality controlled, multi-level, system-exercised clinical laboratory services. From consultants to heads, from technical staff to Inventory managers, from suppliers to importers of kits, reagents, instruments, every unit, every group of personnel became overstrain due to urgency, criticality, significance of timelines for RT-PCR covid tests and pro-



inflammatory biomarkers determination. Hence, after August 2020, when things becoming more clearer, institutes, organizations, professional societies, departments started systematizing and coordinating the work-loads, working shifts, safety, standard operating procedures, inventory managements (for all Personal protective equipments PPEs, kits, instruments, accessories) and in some cases monetary or administrative benefits as well to control and manage this never ending pandemic. This review covers the difficulties faced by Clinical Laboratories and lessons learned and/or advantages that we gained after facing the overall pandemic, restriction-laden, financially burdened scenarios.

### **Role of Clinical Laboratories: Initial challenges**

Owing to sudden drop in patient volume due to pandemic restrictions, business loss and fear of contracting Covid 19 as of April 2020 and onwards, depleting finance at health care institutes made it more harder to procure PPEs, hand sanitizers and related materials, securing wards and even establishing or upgrading RT-PCR for Covid 19 diagnosis [1,2]. Although participation and role of clinical laboratory in any untoward situation, most importantly health related endemics and pandemics, is well established, it is sometimes difficult for the management to facilitate basic requirements, nonetheless upgrading, when monetary flow is hindered or meager [1,3-5]. As mentioned in a recent past study, clinical laboratory can contribute in a pandemic situation like SARS-Covid 19, more than can anticipate, by procuring and/or establishing techniques, methods, protocols of diagnosis, prognosis, disease staging, medication monitoring and with the assistance of family medicine, epidemiology [1,5]. However, due to global and local recession during last three years, cost cutting as per Human resource, technology and infrastructure development, even procurement of better kits (e.g manual to automated; turbidometry to iECL), sometimes became impossible, delayed and/or declined, even at tertiary care institutes, it was argued [1,2,5,6]. Some did continue to facilitate lab professional developments, infrastructure and procurement of new technology at a smaller scale, but such examples were and still very few. Providing Personal Protective equipments (PPEs) and sanitizers for hospital employees and frontline health care professionals, was another very important area that got affected due to high demand and increase in rates [7,8]. However, those with available monetary resources and management commitments continue to do so and provided PPEs as per requirements and recommendations of CDC and WHO [7,9,10].

### **Standard Operating Procedures for personnel health and safety: Next-the Restrictions, Guidelines for pandemic**

Not only did this SARS-Covid-19 pandemic hindered and in some cases devastated the livelihood and financial well being of common man, and even worse at health care centers due to paucity of essential gears, equipments, PPEs, decline in patients volume; but also saw ultra-alert and unusually desolate restrictions, SOPs, guidelines for health and safety of health care workers, doctors, nurses, nursing aids, clinical lab staff, ancillary staff etc [7,10-13]. It was not an easy task to ensure implementation of covid-19 SOPs, which were evolving every month, starting as of April 2020 till August 2020. Although Clinical Lab staff was fully aware and informed about PPEs and SOPs regarding Ebola, Congo, Hemorrhagic fever or Neglaria samples, however those were not pandemic, rarity in volume and thus easily contained and controlled. It took several days to weeks to train, implement, scrutinize, evaluate and keep a watch on adherence to covid-19 SOPs, not only for sampling, processing, analyzing and discarding but also protection of staff itself.

### **Laboratory testing and assays**

Numbers of Covid positive individuals increasing with exponential rate after 2<sup>nd</sup> wave (Nov-Dec, 2020, Jan 2021) and 3<sup>rd</sup> wave (March 2021) with some relive in between. With rising numbers and demands to test more and more suspected or exposed individuals, more efficient and rapid, quality assured RT-quantitative polymerase reaction chain (qPCR) and antibodies/antigen assays against SARS-CoV-2 have been established as early as March 2020, and August/Sept 2020, respectively [2,14]. Moreover, antiviral agents and drugs such as Remdesivir, favipiravir, arbidol and lopinavir/ritonavir, which are RNA-dependent RNA polymerase inhibitors and/or inhibitors viral entry



into target cells and stimulators of immune response [2,15-18]. Lab testing and utilization of newer emerging, rapid, multi level RT-PCR tests and Covid-19 Ab/Ag assays became an essential part of diagnosis, treatment and even simple procedure of admittance to hospital or depending upon viral load and symptoms/signs, shifting to ICUs and HDUs [19,20]. Precise, rapid, reproducible, quality assured RT-PCR or qPCR-for covid 19 was and still needed and should be guaranteed to detect individual with infection, ruling-in or ruling-out the suspicion so that patient could be quarantined, isolated, admitted or receive treatment as early as possible [15-20]. Combining with diagnostic strategies, robust testing abilities, SOPs implementations, Lab continue to participate enormously in confirming Covid-19 cases, detecting suspecting individuals, facilitating clinical decisions, and thus combating this pandemic with all its will, velour and value.

### **Clinical Laboratory Professionals: Recognition they deserve in Covid-19 pandemic**

Never before in history of clinical laboratory that there has been such spotlight and significance given to laboratory testing and that also for a single assay, qPCR or RT-PCR for covid-19 virus, in addition to several others pro-inflammatory markers, that been added over an year or so between April 2020 onwards. Nonetheless, importance of lab testing means worth of Lab personnel, technologists, technicians, support staff and all, in this pandemic of mammoth proportion. The author with 36 yrs of experience of been associated with Clinical laboratories, services, academics, policies, procurements and administration, haven't seen such involvement and/or recognition of solely lab-centered assay(s) and report(s) in indentifying a pandemic infection, in addition to other analytical parameters and facilitating clinical diagnosis and decisions. Several experts worldwide noted and verified that this SARS-Covid 19 pandemic drew attention to the critical work done by clinical laboratories and its personnel, faculty, consultants, staff every day even before this pandemic, since eons and it's always been equally important, as that of physician work, for diagnosis, prognosis, disease treatments, or even simple yearly, bi-yearly well being of any individual, billions in number, all around the world. Nonetheless, having been involved in this grave pandemic situation, availability, usage and facilitation of PPEs and following of protective SOPs for clinical lab staff is important to the same degree as for clinicians, nursing and support staff dealing with covid-19 patients in wards.

### **Conclusion**

This article reviewed role, importance, challenges, and advantages of been part of clinical laboratory and its personnel during SARS Covid-19 pandemic, covering several spheres for the same inclusive of initial stages, restrictions and PPEs, lab testing viz qPCR/RT-PCR and the recognition of clinical lab personnel as frontline healthcare workers.

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