

Polymerase Chain Reaction (PCR) Positivity of COVID-19 reported in Teaching Hospitals of Rawalpindi Medical University Pakistan

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Abstract

Objective

To determine the PCR positive rate of COVID-19 in teaching hospitals of Rawalpindi Medical University amid COVID pandemic.

Material & Methods

A cross-sectional hospital data based research was carried out by retrieving records of PCR tests done pertinent to COVID-19 in Holy Family Hospital and Benazir Bhutto Hospital Rawalpindi affiliated with Rawalpindi Medical University during 2020. Month wise data regarding PCR results was gathered from April – December 2020 and May –December 2020 from Holy Family Hospital and Benazir Bhutto Hospital Rawalpindi respectively. The data was analyzed by means of Microsoft Excel 2010. PCR positivity rates of both hospitals were calculated.

Results

Total 76, 663 PCR tests were done in RMU affiliated teaching hospitals during 2020. PCR positive rates of Holy Family Hospital and Benazir Bhutto Hospital were determined to be 15.2% and 6.1% respectively. The highest percentage of PCR positive patients at Holy Family Hospital was reported during May followed by November 2020. On the other hand, the peak of PCR positivity at Benazir Bhutto Hospital was revealed during May-June 2020.

Conclusion

Teaching hospitals are managing most of the public for their health problems. PCR positive rates reported in these healthcare facilities reflect the tangible picture of COVID-19 prevailing in general public.

Keywords

PCR positivity, COVID-19, teaching hospitals.

Introduction

SAR-CoV-2 was first discovered in Wuhan city of China in December 2019. Life threatening respiratory distress and resultant loss of life were attributed to this potentially fatal virus¹ due to its capability to penetrate and injure the lungs.² With escalating casualties in China and across the globe, World Health Organization (WHO) declared COVID outbreak as Public Health Emergency of International Concern (PHEIC).³ Occurrence of first COVID case in Pakistan was reported on 26th February 2020 by WHO. A total of 9 COVID-related deaths in Pakistan were officially announced by WHO on 26th March 2020.⁴

SARS-CoV-2 infected person is known to infect three more individuals from a general population as average reproduction numbers is computed to be 3.28.⁵ The first kit developed by CDC for testing the samples of patients for SARS-CoV-2 was 2019 Novel Coronavirus RT-PCR diagnostic kit.⁶ National Institute of Health (NIH) Islamabad also verified the use of RT-PCR assay as molecular technique for detection of COVID-19 virus RNA from oropharyngeal / nasopharyngeal swabs of the patients.⁷ Laboratory biosafety guidance specified by WHO for safe handling of samples while diagnosing SARS-CoV-2 were more or less vigilantly observed worldwide.⁸ Viral RNA detection amidst COVID pandemic is being carried out by PCR testing globally in accordance with WHO directions.⁹

SARS-CoV-2 testing facilities were made available and accessible to healthcare workforce in various provinces of Pakistan amidst pandemic.¹⁰ Two of the public sector teaching hospitals (Holy Family Hospital and Benazir Bhutto Hospital) of Rawalpindi Medical University were also equipped with PCR testing kits for diagnosis of COVID-19 among general community as well as those visiting the healthcare facilities with symptoms.¹¹

Numerous studies are done to track RT-PCR findings among COVID patients.¹² The current study would enable our strategic planners to swiftly utilize PCR testing based data of public sector tertiary care hospitals in understanding the gravity of the cases presenting in our country in comparison with international outcomes.

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Materials & Methods

Hospital data based research was carried out by retrieving records of PCR tests done pertinent to COVID-19 in Holy Family Hospital (HFH) and Benazir Bhutto Hospital (BBH) Rawalpindi affiliated with Rawalpindi Medical University during 2020. PCR testing facilities were made available in our teaching hospitals; firstly in Holy Family Hospital (HFH) Rawalpindi during April 2020 followed by provision of diagnostic services at Benazir Bhutto Hospital (BBH) during May 2020. Both are tertiary health care facilities with bed strength of around 1000 beds. Being located in the center of Rawalpindi city they cater the population residing around the Rawalpindi district as well. Month wise data regarding PCR results was gathered from April – December 2020 and May –December 2020 from Holy Family Hospital and Benazir Bhutto Hospital Rawalpindi respectively. The data was analyzed by means of Microsoft Excel 2010. PCR positive rates of both hospitals were calculated.

Results

Of the total 76,663 RT-PCR tests done amidst COVID pandemic done during 2020, about 56567 (73.8%) and 20096 (26.2%) were carried out at Benazir Bhutto Hospital (BBH) and Holy Family Hospital (HFH) Rawalpindi respectively.

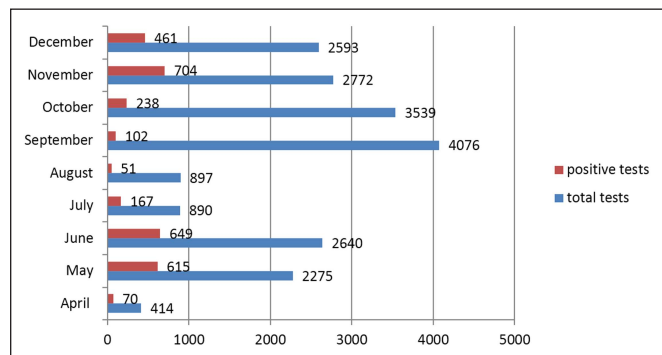


Fig 1. PCR positivity for COVID-19 reported at Holy Family Hospital, Rawalpindi during 2020

PCR testing was started from May 2020 at Benazir Bhutto Hospital but comparatively more testing was done at BBH from October – December 2020 as shown below in Figure 2.

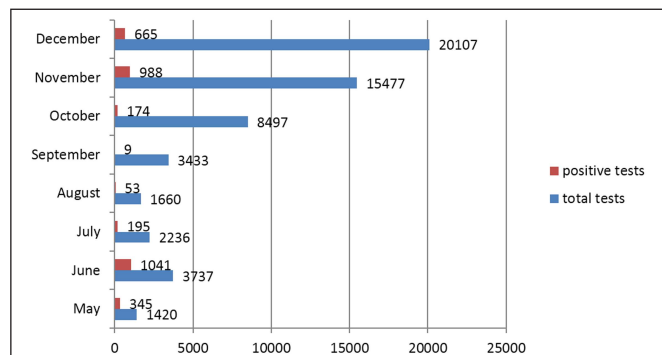


Fig 2. PCR positivity for COVID-19 accounted at Benazir Bhutto Hospital, Rawalpindi during 2020

Month-wise PCR positivity rate pertinent to COVID-19 was higher in HFH than that reported from BBH except during June 2020 as illustrated below in Table 1

Table 1: Month-wise PCR positivity in HFH and BBH

Months 2020	PCR positivity % in HFH	PCR positivity % in BBH
April	16.9 %	-
May	27 %	24.3%
June	24.5 %	27.9%
July	18.8 %	8.7 %
August	5.7 %	3.2 %
September	2.5 %	0.26 %
October	6.7 %	2.05 %
November	25.3 %	6.4 %
December	17.8 %	3.31 %
PCR Positivity rate1	5.2%	6.1 %

PCR positivity rate in HFH = $3057 / 20096 \times 100 = 15.2\%$

PCR Positivity rate in BBH = $3470 / 56567 \times 100 = 6.1 \%$

Discussion

Deadly coronavirus infection could best be predicted by the fact that persons harboring SARS-CoV-2 are capable of infecting 3 more people.¹³ We came to know about coronavirus infection by viewing the statistics about confirmed COVID cases and resultant mortalities that also illustrated the degree of PCR testing done worldwide.¹⁴ Subclinical infection among COVID-19 cases also misled in making accurate diagnosis.¹⁵ Importance of diagnostics in curbing COVID-19 spread cannot be underestimated. Nucleic acid testing has been carried out assertively across the globe for detection of coronavirus.¹⁶ National testing guidelines for RT-PCR testing were also provided by Ministry of National Health Services Regulations & Coordination, Government of Pakistan to direct our healthcare professionals.¹⁷

RT-PCR testing was done in our teaching hospitals affiliated with RMU amid COVID pandemic for diagnosing infected cases. World Health Organization (WHO) has also prioritized nucleic acid and protein testing on COVID outbreak for SARS-CoV-2 detection.¹⁸ Likewise suspected individuals in New York City were tested via PCR for revealing SARS-CoV-2 genome; even PCR positivity was accounted there till 28th day of subsidence of symptoms.¹⁹ RT-PCR testing is valid in testing active viral infection by revealing viral RNA. Moreover, coronavirus was identifiable for longer period by lower respiratory tract sampling.²⁰ The duration of PCR positivity is another facet of COVID-19 that should be studied in detail to find out its significance.

Of the total 414 PCR tests conducted during April 2020 at

HFH, about 70 were positive. On the other hand 1249 PCR verified COVID-19 cases were registered till 8th April 2020 in healthcare facilities of United Arab Emirates.²¹ However, COVID pandemic scenario in Pakistan reveals recognition of 4072 positive cases till 8th April 2020.²² Undoubtedly COVID-19 cases escalated swiftly in different countries including Pakistan and arresting its spread by strict compliance to SOPs and periodic lockdown imposition has been executed to cope up with pandemic scenario.

PCR positivity rate pertinent to COVID-19 among patients visiting Holy Family Hospital and Benazir Bhutto Hospital is determined to be 15.2% and 6.1% respectively. Positivity rate is one of the key metrics to reflect frequency of tests carried out in different regions of the world along with infectivity. As per recommendations of WHO, positive rate of less than 5% is stipulated as controlled epidemic.²³ Being public sector teaching hospitals and located in the middle of the Rawalpindi city, these healthcare facilities not only cater the maximum population of Rawalpindi and Islamabad but also destined to manage the cases coming from the peripheries. Flu filter clinics in both these hospitals were established amidst COVID pandemic with adequate testing amenities and other logistics. The number of COVID suspects and confirmed cases along with their health outcomes were reported periodically to the concerned health authorities for prompt arrangement of human resource and other managerial facilities.²⁴ A research by Sharma K *et al* revealed 100% positivity among combined (nasopharyngeal and oropharyngeal) swabs taken for COVID testing from the population and concluded that both swabs should be taken by our healthcare staff before labeling an individual as PCR negative.²⁵ Moreover, point-of-care-tests are also recommended by WHO due to their cost effectiveness and with an intention to lessen the burden on healthcare facilities.²⁶ Healthcare personnel in our study settings used to take both swabs for RT-PCR testing; however ruling out COVID positivity depending on the type of swab is limitation of our study. This research should also be planned in future to facilitate evidence based decision making.

Conclusion & Recommendations

PCR positive cases detected at public sector teaching hospitals of Rawalpindi depict the mainstream of COVID-19 cases due to provision of healthcare services to the general population round the clock. RT-PCR testing can most probably restrict the spread of deadly coronavirus by isolation of infected people.

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