

A RETROSPECTIVE STUDY OF PREVALENCE OF COVID-19 INFECTION IN TERTIARY CARE HOSPITAL BY REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION RT PCR TESTING

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Abstract

Background: Severe acute respiratory syndrome coronavirus-2 is a RNA virus has emerged as public health emergency affecting worldwide that has caused the COVID-19 pandemic. COVID-19 a highly infectious respiratory disease. This study evaluated the prevalence of COVID-19 infection by using molecular testing in tertiary care hospital. **Materials and Methods:** This retrospective study evaluated TOTAL 40658 Patients tested for COVID-19 infection who came to hospital for testing between March 2021 to May 2023. Detection of COVID-19 infection done by RT PCR. **Result:** A total of 40658 tested for covid 19, of these 4171 (10.25%) were positive 2308 males (55.3%) and 1863 females (44.6%). Positive cases detected out of tested samples were more during April 44% and May 30 % in 2021, January 27%, February 21%, July 13% and august 14.4% in 2022. The incidence of positive cases was more in the age of 20 - 40 yrs (51 %). **Conclusion:** Covid positive rate with RT PCR Testing was 10.25 %, Spike of covid cases occurred at three times April May 2021, January February 2022 and july august 2022 in a decreasing trend. Positive cases were more at 20 – 40 yrs of age.

INTRODUCTION

In December 2019, a increased number of respiratory infections with clinical similarities to viral pneumonia were recorded in Wuhan, China. Which was determined that pneumonia was caused by a novel β -coronavirus.^[1,2] In February 2020, the World Health Organization (WHO) designated the disease COVID-19 (coronavirus disease 2019).^[3] The virus that causes COVID-19 is designated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The WHO declared an end to the COVID-19 global health emergency in May 2023, more than three years after its emergence.^[3]

COVID-19, an infectious respiratory illness caused by SARS-CoV2, has spread to multiple countries worldwide. Coronaviruses are enveloped, positive-sense, single-stranded RNA viruses (betacoronavirus).^[4] The Middle East respiratory syndrome (MERS) virus, another betacoronavirus, appears more distantly related.^[5,6] The spread of the disease from person-to-person like other respiratory viruses, is airborne transmission (droplet borne).^[7]

The symptoms of coronaviruses infections include cough, fever, diarrhea, chest pain, fatigue, body ache, sore throat, rhinorrhea, tachypnea, dyspnea.^[8,9] The presence of glycoprotein spikes on the envelope of

this RNA virus gives it a classic crown-like look under an electron microscope.^[10] This group of viruses is zoonotic, they can be transmitted between animals and people.^[11-13]

MATERIALS AND METHODS

Laboratory Testing

Sample collection for covid-19 testing: Statistical data was taken between March 2021 to May 2023. Appropriate sample collection is the most important step in the laboratory diagnosis of any infectious disease. [Table 1] summarizes different types of samples used for COVID19 testing as recommended by ICMR.^[14]

The clinical sample collected by trained laboratory personnel. Samples for COVID-19 diagnosis are collected from two major sources: upper respiratory tract by nasopharyngeal (NP) swab and lower respiratory tract the oropharyngeal (OP) swab, combined in a single tube to maximize sample load and test sensitivity. ICMR has created a comprehensive Specimen Referral Form for COVID-19 for use by all specimen collection centers and testing labs.^[15]

Diagnostic testing for COVID-19: RT-PCR technique is a gold standard test used for routine

confirmation of cases of COVID-19. The commercial testing kits validated by ICMR targeting a minimum of two regions on the SARS-CoV2 genome was used for diagnosis.

Laboratory confirmed COVID-19 patients had positive results reverse transcriptase polymerase chain reaction (RT-PCR) of nasal and pharyngeal swab, The collected clinical specimens transported to Virology laboratory promptly, and extracted for RNA correctly, followed by RT-PCR detection with

primers and probes of appropriate sequences. The value of cycle threshold (Ct) was the criterion to determine the detection result.

RESULTS

A Total 40658 Samples were tested for COVID 19 by RT PCR Testing, 4171 (10.25 %) were positive.

Table 1: Specimen collection details.

Specimen type	Collection materials	Transport to laboratory	Storage till testing
Nasopharyngeal and oropharyngeal swab	Dacron or polyester flocked swabs*	4 °C	≤5 days: 4 °C >5 days: -70 °C
Bronchoalveolar lavage	sterile container*	4 °C	≤48 hours: 4 °C >48 hours: -70 °C
Tracheal aspirate, nasopharyngeal aspirate or nasal wash	sterile container*	4 °C	≤48 hours: 4 °C >48 hours: -70 °C
Sputum	sterile container*	4 °C	≤48 hours: 4 °C >48 hours: -70 °C
Tissue from biopsy or autopsy including from lung	sterile container*	4 °C	≤24 hours: 4 °C >24 hours: -70 °C
Serum (2 samples – acute and convalescent)	Serum separator tubes (adults: collect 3-5 ml whole blood)	4 °C	≤5 days: 4 °C >5 days: -70 °C

Table 2:

Total samples	COVID 19 Positive	Males	Females
40658	4171 (10.25 %)	2308 (55.3%)	1863 (44.6%)

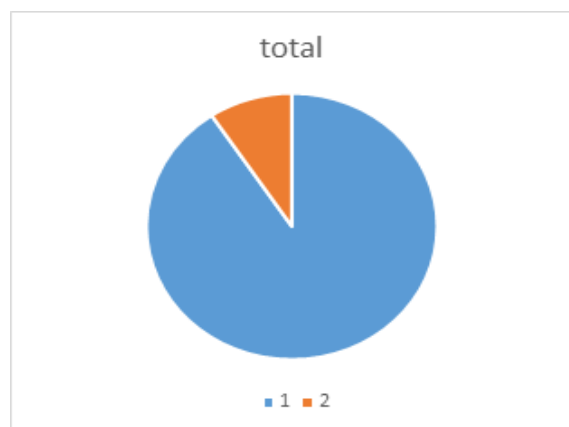


Figure 1: 1 total samples for covid testing, 2 positive cases

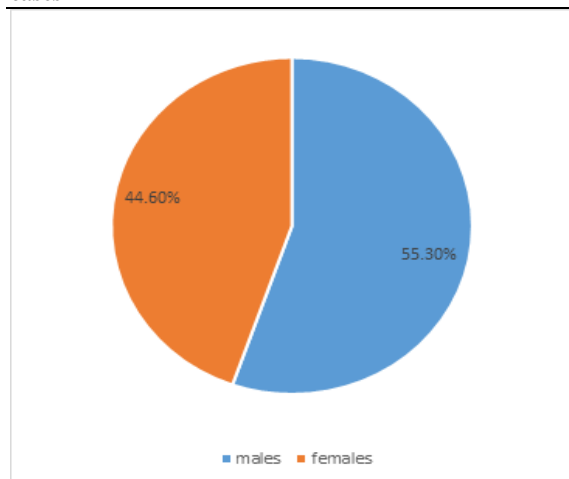


Figure 2: Among COVID 19 positive cases the positive rate among males was 55.3% and Females 44.6%

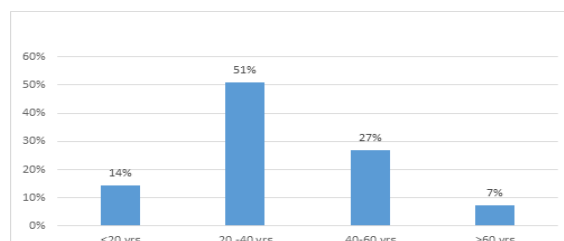


Figure 3: Age distribution among COVID 19 positive cases, 51% in 20 -40 yrs ,27% in 40 -60 yrs , 14% in < 20 yrs and 7 % > 60yrs

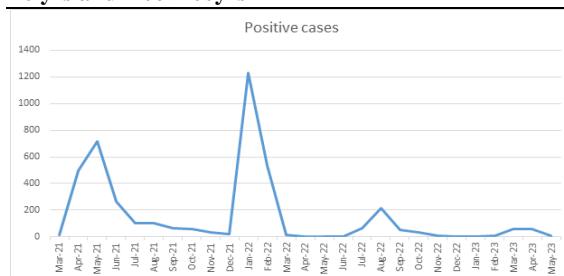


Figure 4

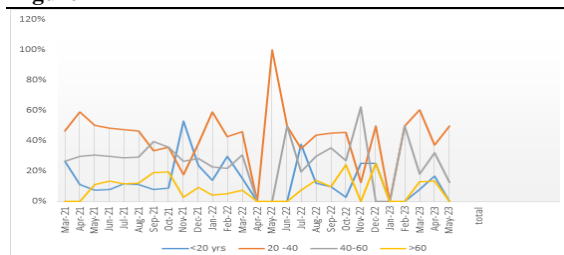


Figure 5: Positive cases detected out of tested samples were more during April 44% and May 30 % in 2021, January 27%, February 21%, July 13% and august 14.4% in 2022.

DISCUSSION

During initial stages of Pandemic COVID 19 the important parameter was travel history then after few months new positive cases without travel history increased and after that complications due to COVID 19 infection. Even though there was decrease in the severity of infection and the most important intervention was early diagnosis of COVID 19 by molecular method RT PCR. So that proper measures were taken like isolation of patient and early initiation of treatment which decreased the spread and complications.^[16]

The symptoms of COVID-19 infection appear after an incubation period of approximately 6 to 14 days. The most common symptoms at onset of COVID-19 illness are fever, cough, and fatigue. It was very essential for early diagnosis to evaluate differential diagnosis of the early onset symptoms like fever so that effective and proper treatment is done without any complications and also to ensure correct preventive measures to decrease the incidence of COVID 19 infection.^[17]

And the best method for early diagnosis of COVID 19 infection are the molecular method RT PCR. In this study total 40658 Samples were tested for COVID 19 by RT PCR Testing, 4171 were positive. Among COVID 19 positive cases there was no much difference between males and Females.

The age group of 20 – 40 yrs in which COVID 19 positive cases were more during. A higher report of infection among aged 60–69 years was found in the study of Banerjee J et al.¹

In India, the first wave began in March 2020 and lasted till nearly November 2020, while the second wave began in March 2021 lasting till the end of May 2021.^[18] In this study the first peak of positive COVID 19 cases was in April 2021 and May 2021, second peak was in the month of January, February 2022 and the third peak with decreased positive cases was in July 2022 to August 2022. This upsurge in cases has been attributed to variant of SARS-CoV-2.

CONCLUSION

COVID-19 is a viral pandemic disease. In many countries including India, the government have taken enormous efforts to control the spread of virus by implementing various measures. ICMR is issuing appropriate guidelines regularly regarding sampling materials, testing kits, validation of kits, developing protocols, etc. Early Laboratory diagnosis of SARS-CoV-2 is extremely important in the disease and outbreak management. Early detection of infection greatly enhances implementation of specific public health intervention and appropriate treatment to decrease morbidity and mortality.

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