



EVOLVING TREND OF PATIENTS WITH SARS-COV-2 IN WEST BENGAL, INDIA.

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ABSTRACT **Objectives:** COVID-19 has resulted in thousands of death worldwide and its transmission among humans is an important topic in this pandemic situation. Our study is the first comprehensive study on the evolving epidemiological trend of SARS-CoV-2 disease from patient of West Bengal, India.

Study Design: Prospective observational data based study over a three-month period amongst all ages and genders.

Methods: Using the gold standard Real Time PCR method to analyze nasopharyngeal and oropharyngeals swab samples for detection of RNA of SARS-CoV-2. Epidemiological data examined to detect prevalence of this disease among symptomatic to asymptomatic population.

Results: Demographic data analysis showed that male population (69.79%) were more infected than female population (30.12%) by SARS-CoV-2. It was also revealed that majority positive cases under the age of 45 years were asymptomatic (64.34%) whereas symptomatic cases were more (65.75%) in older age groups. Month wise distribution amongst the positive individuals indicated that in the month of April, more positive cases (81%) were with symptoms whereas in the month of June, asymptomatic groups predominate (77%).

Conclusions: The evolving trend of COVID-19 disease showing gradual shift of greater positivity among symptomatic to asymptomatic with progress of time from March to end June. It was also identified that predominantly asymptomatic presentation in the younger age group as compared to predominantly symptomatic presentation in older age group. This is expected to have public health impact in understanding the disease so that appropriate public health measures can be undertaken.

KEYWORDS : SARS- CoV-2, Evolving trend, symptomatic, asymptomatic, public health

INTRODUCTION:

COVID 19 is a devastating, contagious pandemic disease, which has taken the world by storm and routed the livelihood and economy of humankind on a global scale. The disease is caused by a beta coronavirus and the infection has affected more than millions of people globally. This has been reported to have originated from Wuhan, China where a cluster of pneumonia patients with an unidentified cause emerged which spread rapidly from person to person to become major epidemic.¹ After analysis of genome sequence, this was considered to be caused by a novel coronavirus (CoV) named 2019-nCoV (COVID 19) which later on named as SARS-CoV-2.^{2,3} WHO declared this as a pandemic on March 11, 2020. The disease has become a major public health issue because of its rapid human-to-human spread and high mortality in persons of older age and other comorbidities. There have been reports of various pattern of presentation and the pattern varied widely-ranging asymptomatic to fever, headache to severe symptoms.⁴ Another key epidemiological parameter that could give information on the intensity and range of social distancing strategies to combat COVID-19 is the asymptomatic proportion, which is broadly defined as the proportion of asymptomatic infections among all the infected patients of the disease.⁵ For appropriate planning of public health measures it is essential to study the epidemiological pattern properly.⁶ We have not found any literature relating to epidemiological findings of the disease particularly any change of trend of symptomatic verses asymptomatic cases in our country.

AIMS AND OBJECTIVES

- 1) To analyze the demographic related data of the SARS CoV-2 (COVID 19) positive patients
- 2) To analyze the symptomatic and asymptomatic proportions amongst the positive cases
- 3) To study the above parameter over a period of three months to find any change of pattern of this infection

METHODS:

Clinical Sample collection

To participate in this study informed Sample referral form (SRF) developed by ICMR was obtained from each patient. This study protocol was approved by the Institutional ethical committee of Institute of Post Graduate Medical Education & Research (IPGME&R), Kolkata. A total of 36,426 nasopharyngeal and oropharyngeal swabs of the suspected patients with associated symptoms were collected in viral transport media (VTM) (Himedia Labs, India) from different district hospitals of West Bengal from 14th March to 17th June, 2020 following strict biosafety measure. The laboratory diagnosis for SARS CoV-2 (COVID 19) was done at IPGME&R-Virus Research and Diagnostic Laboratory (VRDL) as approved by ICMR, Govt. of India.

The viral RNA was extracted by using Qiagen Viral RNA mini kit (Qiagen, Germany) as per manufacturers protocol in Biosafety class II B2 by following proper aseptic procedure and strict adherence to biosafety issues. Extracted RNA was stored at -80°C until further use. The extracted RNA was subjected to molecular detection by Real Time Reverse Transcription PCR (Biorad CFX 96, USA) using the protocol provided by ICMR-NIV, Pune, India. (https://www.icmr.gov.in/pdf/covid/labs/1_SOP_for_First_Line_Screening_Assay_for_2019_nCoV.pdf; https://www.icmr.gov.in/pdf/covid/labs/2_SOP_for_Confirmatory_Assay_for_2019_nCoV.pdf.) A two-step strategy for the diagnosis of SARS CoV-2 (COVID 19) using qRT-PCR was adopted.⁷ Initial screening was performed for E (envelope) gene specific to Sarbeco sub-genus. Samples positive in the screening test were further subjected to a confirmatory test targeting two genes, one SARS-CoV-2 specific RdRp (RNA dependent RNA polymerase) gene and other Sarbeco sub-genus ORF-1b-nsp14 gene.^{8, 9} The sample positive for either of the two genes were confirmed as positive for SARS CoV-2.

RESULTS:

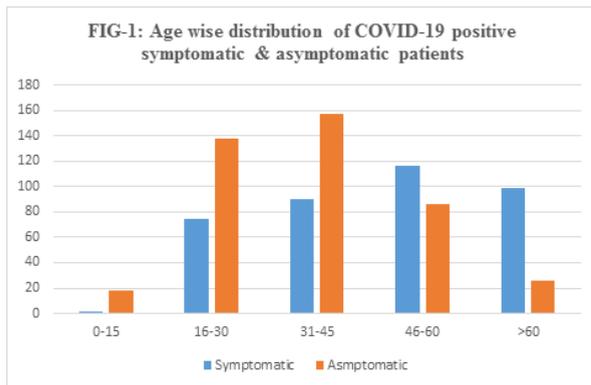
A total of 36,426 samples were screened from 14th March to 17th June, 2020. Out of them 71.49% (n=26,041) were male and rest 28.51% (n=10,385) were female. Their age ranged from 3 days to 108 year. Of

those 917 patients (2.5%) were found SARS CoV-2 (COVID 19) positive of which 69.79% were male and 30.21% were female (Table 1).

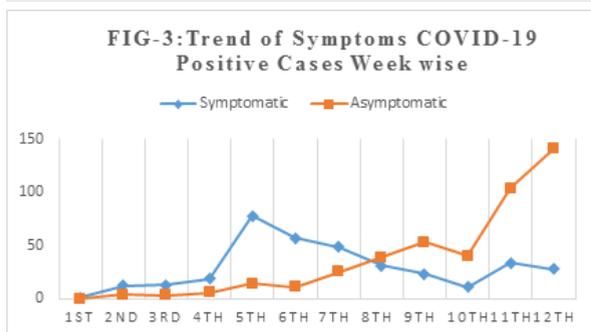
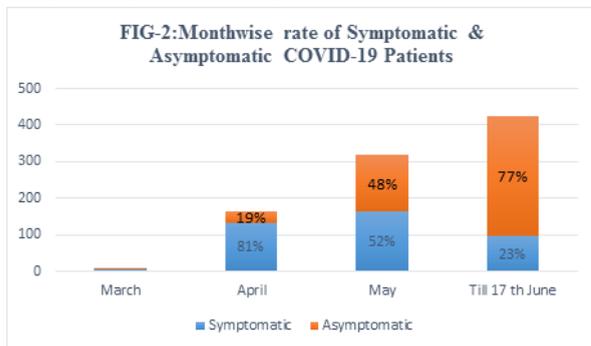
Table:1 Gender wise data of total number of cases and positive cases

Data	Total cases =36,426		Positive cases	
	Male	Female	Male	Female
Total Number (N)	26,041	10,385	640	277
Percentage (%)	71.49%	28.51%	69.79%	30.21%

To understand the true morbidity of the positive cases, SARS CoV-2 (COVID 19) positive patients were divided age wise into 5 groups (Group 1: 0-15 years, Group 2:16-30years, Group 3: 31-45 years, Group 4:46- 60 years, Group 5: above 60 years). Fig. 1 depicts distribution of the symptomatic or asymptomatic nature of the positive cases in those age groups. It reveals that below the age of 45 years asymptomatic positive cases were more in number (64.34%) than symptomatic ones (34.66%). The number of positive cases in groups > 45 years were more with symptomatic infection (65.75%).

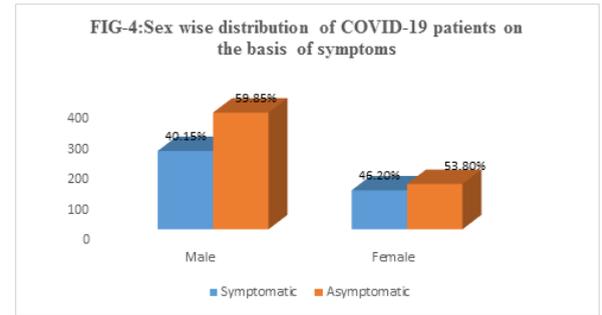


Month wise distribution of the symptomatic and asymptomatic cases amongst the positive cases indicated that in the initial months, cases were more from symptomatic persons whereas in the later part asymptomatic groups predominate (Fig. 2). After getting this month wise change of trend, the data were analyzed week wise, which revealed that after 6th week there was an upward trend of asymptomatic positive cases (Fig.3).



When we started the testing of SARS CoV-2 (COVID 19) in the month of March, symptomatic cases were more prevalent till April. Though from May month onwards the trend changed which showed asymptomatic case were high in number. Total positive cases were also analyzed sex wise in respect of symptom present (Fig. 4) which

depicted that male population (69.79%) were more infected than female population (30.12%). It also indicates that in both male and female asymptomatic positive cases were more in number than symptomatic ones.



DISCUSSION:

As the COVID 19 pandemic unfolds and spreads from country to country, the administration is keen to know the pattern of spread and behavior of the disease so that appropriate public health measures can be undertaken. The virus is reported to be transmitted through droplet or fomite from an infected person's airway or through contamination of different objects or surface.¹⁰ The proportion of asymptomatic positive cases is a useful parameter to assess true burden of the disease. This proportion varies widely from one disease to other – 8% in measles, 32% in noro virus but 90-95% in polio.⁵

In our study, 917 patients were found SARS CoV-2 (COVID 19) positive of which 30.21% were female and 69.79% were male. In similar study by Kenji Mizumoto et al. 2020⁵, of the 634 positive cases found by them in which 49.36% cases were females.⁵ This difference of male/female involvement might be due to male being predominantly involved in the outdoor activities in this part of the country.

The study reveals that, with passage of time, the disease, which were initially predominantly symptomatic, had been found to be spread over asymptomatic persons. In the month of April, 81% of the positive cases were symptomatic whereas in the month of June, 77% were asymptomatic. A detailed analysis states that from the 5th-6th week this change of pattern was noticed. It indicates that in the initial days the disease was confined amongst symptomatic individual (or the virus was producing symptoms) but with passage of time a huge number of individuals are carrying the virus silently. Another interesting finding as revealed in the study was that with progression of age more symptomatic persons are found to be involved. This change of pattern is more apparent on either side of 45 years. This information is more vital since the older age group is more likely to suffer from comorbidities and hence the mortality rate may escalate. Stronger immunity in the younger age group might be the reasons of predominantly asymptomatic presentation in them. More number of patients studied on this subject is required before come to any conclusion.

Assessment of percentage of asymptomatic persons getting involved is an important indicator for providing insight into the transmission of the disease.¹¹ In our study, of the 917 persons found positive over a period of more than 3 months where 56.27% were found to be asymptomatic. It corroborates with the findings of Kenji Mizumoto et al. 2020.⁵ In the same study, they have found that the percentage of asymptomatic positive cases has increased exponentially from 16.1% to 50.5% within a single week of February 2020. In our study it was also noted that the asymptomatic and symptomatic proportion has been reversed from April to June- over these three months. Of the total positive cases in April, 81% were symptomatic patients but in the month of June, only 23% are symptomatic. In addition, this had been acquired through a slow change of pattern spread over this period. This might be indicating an improvement of situation which reflect that growth of some degree of immunity but at the same time silent spread. Regarding degree of human-to-human spread in asymptomatic cases, there are various views and no specific documentary evidence is available, though this is a debated topic these days. SARS CoV-2 (COVID 19) infected patients are the main source of infection, and severe patients are considered to be more contagious than mild ones.¹² Some researchers has found that there is no difference in the transmission rates of coronavirus between symptomatic and asymptomatic patients.¹³ This matter even has already been debated on other RNA

viruses. Viral shedding pattern of COVID-19 patients found to be similar to patients infected with influenza.¹⁴ Dennis et al. 2017¹⁵ after studying influenza virus in this respect has found that influenza viral shedding takes place even when the persons are asymptomatic, pre-symptomatic or mildly symptomatic.

Our study shows a tendency to preponderance in males as compared to females especially in the working age group of 31-45 year, as because of greater external environmental exposure while travelling to workplace not only in healthcare workers working in hospitals but in the general public as a whole. This conforms to the universal norm as the chances of spread by contact, droplet and even airborne transmission are all increased by going outdoors.

In conclusion, the shift in trend of infections from predominantly symptomatic to predominantly asymptomatic over a period of 12 weeks continuous and un-interrupted surveillance probably indicates a change of trend. Predominantly asymptomatic presentation in the younger age group as compared to predominantly symptomatic presentation in older age group is a finding of paramount public health importance since the older age group mortality has been reported to be higher.

Conflict of Interest:

The authors declare they have no conflict of interest.

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