Real Time-PCR (RT-PCR) Positivity for SARS-CoV-2 in Suspected COVID-19 Patients Presented in a Tertiary Care Hospital

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Abstract:

Introduction: Corona Virus Disease 2019 (COVID-19) is caused by SARS-CoV-2, a newly emergent virus. World Health Organization declared COVID-19 as pandemic on March 11, 2020 for its rapid spreading. Not only to diagnose the disease (confirm case) but also to control and contain the transmission; test, trace and isolation are fundamental. RT-PCR for SARS-CoV-2 is used to detect and diagnose COVID-19 which started in Dhaka Medical College Hospital (DMCH) on 2nd April 2020. In this study we described our observation of RT-PCR done in patients presented in DMCH in the first month after starting the test.

Methods: This observational, cross sectional study was done to find out the rate of RT-PCR positivity in suspected COVID -19 patients presented to DMCH from 2nd April to 3rd May, 2020 by the Department of Medicine in association with the Department of Virology. Data was collected from the registry book of the Department of Virology. The rate of RT-PCR for SARS-CoV-2 positivity among the suspected COVID-19 patients and demographical variable was observed.

Results: Among the total studied patients (n=3206), 58.8% (n=1886) was male and mean age was 37.7(±14.38784) years. RT-PCR for SARS- CoV-2 was positive in 26.9% (n=864). Mean age was higher in patients positive for test (39.6± 15.9 year vs. 37±14.4 year). Male predominance was more marked in patients with positive PCR test (68.4 vs. 55.9).

Conclusion: High rate of positivity of RT PCR for SARS-CoV-2 among the suspected patient for COVID 19 indicated high disease burden and transmission in this highly populated area in the early period of pandemic which should be considered as was alarming.

Key words: COVID-19, RT-PCR, SARS-CoV-2.

Introduction:

From December, 2019 a new corona virus emerged and till 4th June 4, 2020, there have been 6,397,294 confirmed cases and 383,872 deaths, reported to WHO[1]. For its aggressive, rapidly spreading contagious nature, on

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March 11, 2020 World Health Organization (WHO) declared this novel Corona Virus Disease, 2019 (COVID-19) as a pandemic.[2] This virus has also been named as SARS- CoV-2 by the International Committee of Taxonomy of Viruses (ICTV).[3] Testing individuals for COVID- 19 is one of the crucial corner stone to fight against the pandemic. It is the only way a country can detect the cases for isolation, proper treatment, and contact tracing (IPC). Testing is our window onto the pandemic. That's why the value of testing was rightly focused by the chief of WHO on March 16, 2020 by the famous words, "Test, Test, and Test". Truly, we cannot fight a fire blindfolded. The world followed and great results were achieved by countries like China, South Korea, Singapore and even neighboring regions like Kerala in India. On the contrary, country like USA has come under fire from critics for slow gearing up of testing. Bangladesh with a low economic status has been thriving to increase testing since its first case detected on March 08, 2020. It is true that there has not been urgent enough escalation in testing in Bangladesh due to issues like unavailability of proper laboratory structures, low resource of equipment and funding, lack of trained

personnel etc. Initially, Institute of Epidemiology, Disease Control and Research (IEDCR) of Bangladesh was the only center which started testing. According to the press releases of Directorate General of Health Services, Bangladesh, testing capacity has been increased from 92 daily (24-03-2020) to 9,554 tests daily (25-05-2020) being carried out in 48 labs and 35,585 cases have been detected from 2,54,068 tests, 4373 has recovered and 501 died till May 25 with 20.7% infection rate and 1.4% death rate.[4] Dhaka Medical College Hospital started RT-PCR testing from 2nd April, 2020. This article is an initial observation over our results and insights up to now.

Materials and Methods:
This cross sectional study to find out the rate of RT-PCR positivity in suspected COVID -19 patients was conducted in Dhaka Medical College Hospital from 2nd April, 2020 to 3rd May, 2020 by the Department of Medicine in association with the Department of Virology. The department of Virology has the BSL-2 facility which is the minimum requirement to do RT-PCR. The people who were presented as suspected COVID-19 cases and came for RT-PCR for SARS-CoV-2 were included in the study. Data was collected from the registry book of the Department of Virology, Dhaka Medical College. Consent from the patients and ethical clearance from the institution were taken. The general objective of this study was to find out the rate of RT-PCR for SARS-CoV-2 positivity among the suspected COVID-19 patients. The special objective was to assess the demographic variables of the RT-PCR positive confirmed COVID-19 cases and also the RT-PCR negative suspected cases. Data was analyzed using the SPSS 26 manufactured by IBM.

Results:
Total 3206 samples of nasal or pharyngeal swabs were taken in the study period of which 58.8% (n=1886) were male and 40.8% (n=1304) were female. The sex mentioning was missed in 16 cases (0.5%) [Table-I]

Table-I

Sex distribution of participants test for RT PCR (n=3206)

Sex	Frequency	Percentage (%)
Female	1304	40.7
Male	1886	58.8
Missing data	16	0.5
Total	3206	100

Among the participants, 26.9% (n=864) patients were positive for RT-PCR for SARS-CoV-2; 72.7% (n=2330) were negative and 12 (0.4%) sample found to be indeterminate. [Table-II].

Table -II

Result of RT PCR for SARS COV-2 (n=3206).

Test report	Frequency	Percentage (%)
Negative	2330	72.7
Positive	866	26.9
Indeterminate	12	0.4
Total	3206	100

Among the RT-PCR positive SARS-CoV-2 cases the highest population remains in the 31-40 year age group (211; 24.36%) followed by 21-30 year age group (206; 23.79%) and 41-50 year group (144; 16.63%) The lowest COVID- 19 detection was in the age group less than 10 years (25; 2.89%) [Table- III] This is also the same in the suspected COVID cases who were RT-PCR negative. Here most of the cases came from 31-40 year age group (721, 30.94%) followed by the 21-30 year age group (677, 29.06%).

Table-III

Age distribution with frequency and Mean age of studied participants positive for SARS-CoV-2 (n=866)

Age in years	Frequency	Percentage	Mean age
<=10	25	2.89	39.6±15.91
11-20	55	6.35	
21-30	206	23.79	
31-40	211	24.36	
41-50	144	16.63	
51-20	125	14.43	
61-95	87	10.05	
Missing data	13	1.5	
Total	866	100.00	

The mean age of the participants was 37.7 years (Standard deviation ±14.38). The mean age of the COVID-19 patients was 39.6 years (standard deviation ± 15.91) [Table-V].

In patients with RT-PCR Male was 68.4 %(n=592) and female was 31.6 %(n=274) and in patients with RT-PCR male was 55.9 %(1294) and female was 44.1 %(n=1020) [Table-VI].

Table-IV

Mean age distribution of participants studied (n=3206).			
Variable	Frequency	Mean	Standard Deviation.
Mean Age among participants (Year)	3,151	37.7	±14.38784
Mean Age among RT-PCR positive COVID-19 cases (Year)	853	39.6	±15.9108
Age among RT-PCR negative suspected COVID-19 cases (Year)	2,294	37.0	±13.71181

Table-V

Sex Distribution SARS-CoV-2 positive and negative patient		
RT PCR for SARS- Cov-2		Percentage (%)
Positive (n= 866)	Male	68.4% (n=592)
	Female	31.6% (n=274)
Negative (n= 2330)	Male	55.9% (n=1294)
	Female	44.1% (n=1020)

Discussion:

Rapid collection and testing of appropriate specimen from the patients who meet the criteria of suspected case definition for COVID-19 is a priority for clinical management and outbreak control and suspected cases should be screened for the virus with nucleic acid amplification tests (NAAT), such as RT-PCR.[5] Even if there is suspicion of co-infection, the cases must be tested for COVID-19 virus regardless of whether any other respiratory pathogen is found or not[3]. In this study 100% samples were taken from the respiratory tract. It is proven that respiratory samples for RT-PCR have the greatest yield; though it can be detected from other specimen like- blood, stool etc.[6,7,8]

In one- month case collection (2nd April-3rd May2020), total number of study population was 3206. Most of them (99%) were from Dhaka district. Because of lock down, very few cases came from the areas outside Dhaka. Among them, the male were 58.8%, which is consistent with the study done by Li Q et al, where it is 56%;[9] but more than the study done by Tao Al et al[10] and Zhang JJ et al[11] where the percentages were 46% and 50.7% respectively. The rate of positive RT-PCR was 26.9% [Table-2], what is lower than the study by Rui Liu et al[12]. Our rate is quite high in comparison with our national rate of positive RT-PCR for COVID-19 which is 21%; but consistent with the finding of WHO, where

the highest attack rate was observed from 4th April to 4th May, 2020 in Dhaka district[13].

Among the positive cases, most were in the 21-40 year age group [Table-3]. This finding is inconsistent with other studies.[11, 13] This finding is alarming for us because people of this age group are the young, income generating, mobile population of our country. So being more affected of this age group signifies that lockdown process, social distancing, personal hygiene and other preventive measures to combat this virus should be more strictly followed. This is also true about the RT-PCR negative cases as because the test can be false negative. A negative result does not exclude the possibility of this infection and should not be used as sole indicator to treat the case.[14] Clinical judgment is the prime need to manage a COVID-19 case.

The mean age of the positive cases was 37.7 years, which is much lower than the finding of Rui Liu et al.[13] Mean age of patients with positive RT-PCR for SARS Cov-2 was higher than that of with negative test [Table-5]. Marked male predominance in patients with positive test has important clinical implication [table-6], since male sex and old age is associated with increased mortality.[15]

Limitations:

This was the initial finding of an ongoing process. So the actual disease burden may not be ascertained from this study. Moreover, the information were collected from the registry of the concerned department. So, detailed information including clinical parameters and other lab findings could not be obtained. Further large scale, multi-centered study is a must to get the real national scenario of this pandemic.

Conclusion:

RT-PCR for SARS-CoV-2 remains the most specific test to confirm COVID-19 case unless and until other WHO

recommended tests are available. High positivity rate of RT PCR for SARS-CoV-2 among suspected COVID 19 patients indicates transmission of infection is already in full swing. Larger epidemiological study is needed to characterize magnitude transmission and to estimate disease burden.

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