

TMSS Medical College Journal (TMCJ)

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COVID-19 Special Issue

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Original Article**Profile analysis of COVID-19 suspected person attending for Real Time-PCR (RT-PCR) test in a tertiary level hospital, Bogura, Bangladesh**Rahman MM¹, Islam MR^{2*}, Ahmad FU³, Afrin MJ⁴

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Abstract

Background: On 11th March, 2020 COVID19 was declared as a pandemic by WHO for its rapid spreading and it currently involves more than 210 countries worldwide. only to diagnose the disease (confirm case) but also to control and contain the transmission; test, trace and isolation are fundamental. Bangladesh declared its first case on 8th March 2020. RT-PCR for SARS-CoV-2 is used to detect and diagnose COVID-19 which started in TMSS Medical College and Rafatullah Community Hospital (TMC & RCH) on 1st May 2020. In this study, the profile of the COVID-19 suspects has been analyzed attended for RT-PCR Test in TMC & RCH, Bogura, Bangladesh. **Materials and Methods:** This cross-sectional descriptive study was done to find out the rate of RT-PCR positivity in suspected COVID-19 suspected attending in TMC & RCH from 1st May to 30 June, 2020. Data was collected from the 'sample collection form' and the 'registry book' of the department of Microbiology. The total number of respondents was 3120. Both the univariate and bivariate statistics were used to analyzed the data through IBM SPSS 25.0 software. **Results:** Demographic data, travel history, clinical features, and outcomes were summarized and compared with the results of RT-PCR test for SARS-CoV-2. Among the total studied population (n=3120), 76.3% (n=2379) were male with a mean age of 40.9 (± 14.8) years. 38.8% (n=1212) were service holders (non-medical) and 61.2% were from the urban area. RT-PCR test for SARS-CoV-2 was positive among 36.7% (n=1144). Mean age was higher among the SARS-CoV-2 positive (43.5 $\pm$ 14.7 years vs 39.43 $\pm$ 14.61 years). The number of service holders and businessmen were also higher among the positive patients and which is statistically significant (p<0.000). **Conclusion:** High rate of positivity of RT-PCR for SARS-CoV-2 among the suspected population 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; TMC & RCH.

Introduction

The outbreak of novel coronavirus-2 (nCoV-2) was declared as a pandemic and an international public health emergency by the World Health organization (WHO) on March 2020. The whole world comprehensively is working to address this pandemic due to rapidly its spreading and emerging situation. After appearing of this virus in December 2019, it has been currently (June 10, 2020) identified in 213 countries and territories across the world, by which

more than 7 million people has listed as confirmed cases novel coronavirus positive. Although about 3.61 million of patients have already recovered, and another 0.4 million patients have been reported as death globally¹. To understand the biology of nCoV-2 and the epidemiology of the novel coronavirus disease known as (COVID-19), the number of the researchers and scholarly people around the world are desperately working together as public health emergency.

COVID-19 virus is significantly higher than other virus of the infected people ever overwhelmed on the consequences in the capacity of health facilities developed so many health care systems in every country of the world². About 20% of COVID-19 infected patients lead to getting serious and complex situations. For COVID-19 virus, young people, and adults >60 years old along with co-morbid conditions have been treated as most vulnerable group.

Despite the comprehensive effort by the scientist or researchers of entire world, there are no vaccines for COVID-19 disease yet discovered. As a result, non-therapeutic types of curing intervention to control the spread of this virus are used as only way to control this novel coronavirus³. Globally, billions of people are staying home quarantine to get rid of this virus. Many countries are adopting numerous things such as avoiding international travel, shifting official activities from office to home, strictly maintaining physical distances among each other, mandatory lockdowns and so forth. In this regard, Bangladesh as a lower-middle income country with having large number of populations is struggling to cope up with this pandemic situation and to fight the spread of the disease.

In Bangladesh, COVID-19 infected patient has confirmed by March 2020⁴. Afterwards, it has been spreading across the country and now, the rate of affecting patients of COVID-19 virus is the highest among other Asian countries. To prevent the spread of this virus, Bangladesh Government as well as Ministry of Health and Family Welfare has already taken plenty of actions such as home quarantine throughout country, postponements all international flights, cancellation of public gathering events and so forth. As a result of those initiatives, the normal flow of raw materials, products and services, capitals, humans in labour activities and business shutdowns temporarily⁵. Threats on socio-economic development and the normal flow of its preservation is being hampered by this pandemic mostly. To prevent outbreak of coronavirus, Bangladesh Government firstly announced 10 days quarantine time in the early days of this pandemic as general holiday on March 22, 2020.

Later on, the holiday was extended five more times till 30 May 2020. By June 10, 2020, Bangladeshi government has published testing report of COVID-19 patients, which 0.74 million of the people confirmed as COVID-19 positive cases in total, and among them, 16 thousand of the patients recovered from this virus across the country⁴. Due to having lack of general awareness as well as social safety net of COVID-19, the recovering processes of the patients is getting more challenging as a whole. Thus, the study was conducted to analyze the profile of COVID-19 suspected attending for RT-PCR test in TMC & RCH, Bogura, Bangladesh. More specifically the study was carried out (i) to identify the socio-demographic profile of the COVID suspected people; (ii) to find out the current clinical profiles of the covid-19 positive people; and (iii) to see the association between the socio-demographic profile and RT-PCR outcome.

Materials and Methods

This hospital based cross-sectional study was conducted to find out the rate of RT-PCR positivity in suspected COVID-19 patients attending in the RT-PCR Lab of TMSS Medical College and Rafatullah Community Hospital (TMC & RCH), Bogura, Bangladesh from 2nd May, 2020 to 30th June, 2020. The department of Microbiology of TMC & RCH has the BSL-2 facility which is the minimum requirement to do Reverse transcription polymerase chain reaction (RT-PCR). The people who were presented as suspected COVID-19 cases and came for RT-PCR for SARS-CoV-2 in TMC & RCH were included in this study. Data were collected from the registry book of the Department of Microbiology, TMC & RCH. Consent from the patients and ethical clearance from the institution were taken. The collected data were first checked for its completeness and consistency. The data then, entered on the computer program IBM SPSS version 25 for analysis. The descriptive statistics such as frequency, percentage, mean, standard deviation; and the chi-square test were used.

Ethical Consideration

The study has been ethically approved by the Ethical Review Committee of TMSS Medical College. All the

ethics related to the study has been strictly follow in this study.

Results

Socio-demographic characteristics of the participants

Among the total participants (n=3120), who took part in RT-PCR, 76.3% were male and 23.8% were female. This finding indicates a preponderance of male suspects. The sex ratio indicates that there is huge gap between male and female in testing COVID-19 positive case. It also indicates, among the participants males were more causes to do the RT-PCR test than females. Age is an important determinant for RT-PCR test outcome and therefore must be taken into consideration while suspecting a person of being suffering from COVID-19. Twenty-four-point six percent suspects are from less than 30 years age group, 23.3% from 30 to 39 years age group, 23.4% from 40 to 49 years age group, 17.2% from 50-59 years age group and 11.6% from equal and greater than 60 years age group. The table also identifies that, 71% respondents belong to 30 to 59 years of age. As is expected, older people (60+ years) are at increased risk of being infected, this study do not find more older respondents than younger ones. The important findings of this study are that the people with the age 'less than 30 to 49 years old' was came to TMC & RCH for RT-PCR test. When occupation of the participants was considered, most of them were found as either Non-medical Service-holders (38.8%) or businessmen (17.8%) or housewives (13.4%). Among the rest 2.6% were the Physician or Nurse or Health Workers, 4.1% were farmers, 8.1% were students, 2.8% were retired servicemen, 5.3% were unemployed, 5.1% were from other occupation. In gender consideration, 13.4% were the 'house wives' whose number were 418 of the total number 3120. Area of residence has some importance in the transmission of Corona virus. In this study, 61.2% COVID-19 suspects were from urban areas, 25.1% from semi-urban areas and only 13.7% from rural areas. It gives an indication, that rural people are less likely than urban people to be suspected as COVID-19 positive.

Table-I: Distribution of participants according to the socio-demographic characteristics (n=3120)

Categories	n	%
Sex		
Male	2379	76.3
Female	741	23.8
Total	3120	100
Age		
< 30	767	24.6
30-39	726	23.3
40 - 49	729	23.4
50-59	537	17.2
≥60	361	11.6
Total	3120	100
Mean ± SD	40.9±14.8	
Occupation		
Service Holder (non - medical)	1212	38.8
Physician/Nurse/Health Workers	81	2.6
Business	554	17.8
Farming	129	4.1
Unemployed	164	5.3
House Wives	418	13.4
Student	252	8.1
Others	158	5.1
Retired Service Men	88	2.8
Occupation unknown	64	2.1
Total	3120	100
Living Area		
Urban	1910	61.2
Semi -Urban	782	25.1
Rural	428	13.7
Total	3120	100

Regarding RT-PCR for SARS-CoV-2 test outcome, 36.7% were identified as 'positive', and 63.3% as 'negative'. That means among 3120 participants, 1144 were identified as the positive case who carried SARS-CoV-2 virus.

Table-II: Distribution of participants by the outcome of RT-PCR test for SARS-CoV-2 (n=3120)

Outcome	n	%
Positive	1144	36.7
Negative	1976	63.3
Total	3120	100

Thus, findings in this study revealed that, only about one-third of the suspected cases (for COVID-19) are COVID positive, most of the COVID suspected cases are from urban and sub-urban areas and are Non-medical service holders by profession. Based on above clarification, it has identified among total participants of RT-PCR test, regarding living area, mostly live in urban and semi-urban areas. In connection to occupation, service-holders occupied the largest figure though in age-category, lower age people visited RCH for RT-PCR test. But among 3120 persons, 361 persons whose age were above 60 years tested RT-PCR for knowing the exact fact. That indicates, in surrounding areas of Bogura where RCH

is located, lower age people who are living in urban areas are suspected mostly than rural areas and youths who under 'less 30 to 49 years old' are also suspected than the age-old people.

RT-PCR test outcome and Socio-demographic characteristics of the participants

Among the total 3120 participants, 1144 (36.7%) were identified as the COVID-19 positive and 1976 (63.3%) were identified as the COVID-19 negative. The mean age ($\pm$ SD) was 43.5 ± 14.77 years and 39.43 ± 14.61 years for COVID-19 positive and COVID-19 negative respectively and the mean age were significantly higher ($p < 0.000$) for the COVID-19 positive cases. On the other hand, participants with COVID-19 positive and negative has not significantly associated with the sex ($p > 0.005$). But the occupational status of the participants has statistically significant association with the COVID-19 positive and negative outcome. Business man and retired person are comparatively high positive compare to negative.

Table-III: Distribution of the socio-demographic characteristics with SARS-CoV-2 positive and negative outcome (n=3120)

Characteristics	COVID -19 positive (n = 1144)	COVID -19 negative (n = 1976)	Total (n = 3120)	P Value ^a
Age (in Years)				
Less than 30	211 (18.4 %)	556 (28.1 %)	767 (24.6 %)	<0.000 ^a
30 to 39	240 (21.0 %)	486 (24.6 %)	726 (23.3 %)	
40 to 49	304 (26.6 %)	425 (21.5 %)	729 (23.4%)	
50 to 59	226 (19.8 %)	311 (15.7 %)	537 (17.2%)	
60 and above	163 (14.2 %)	198 (10.0 %)	361 (11.6%)	
Mean ± SD	43.5 ± 14.77	39.43 ± 14.61	40.9 ± 14.8	
Sex				
Male	872 (76.2 %)	1507 (76.3 %)	2379 (76.3%)	0.979
Female	272 (23.8 %)	469 (23.7 %)	741 (23.8%)	
Occupation				
Service Holder	432 (38.3 %)	780 (40.5 %)	1212 (39.7%)	<0.000 ^a
Physician/Nurse/ Health Worker	27 (2.4 %)	54 (2.8 %)	81 (2.7%)	
Business	230 (20.4 %)	324 (16.8 %)	554 (18.1%)	
Farming	25 (2.2 %)	104 (5.4 %)	129 (4.2%)	
Unemployed	22 (2.0 %)	142 (7.4 %)	164 (5.4%)	
House Wife	223 (19.8 %)	195 (10.1 %)	418 (13.7%)	
Student	63 (5.6 %)	189 (9.8 %)	252 (8.2%)	
Others	52 (4.6 %)	106 (5.5 %)	158 (5.2%)	
Retired Person	54 (4.8 %)	34 (1.8 %)	88 (2.9%)	
Living Area				
Urban	714 (62.4 %)	1196 (60.5 %)	1910 (61.2%)	<0.045 ^a
Semi -Urban	296 (25.9 %)	486 (24.6 %)	782 (25.1%)	
Rural	134 (11.7 %)	294 (14.9 %)	428 (13.7%)	

a. The Chi-square statistic is significant at 0.05.

Clinical sign symptom of the COVID-19 suspected participants

Among the all respondents, 44.8% was asymptomatic and 55.2% was symptomatic. The most common symptoms with COVID-19 positive respondents were fever (46.7%), cough (43.6%), sore throat (30.6%), Headache (27.0%), Body Ache (26.9%), Breathlessness (15.6%). The result is also statistically significant with the data of participants with COVID-19 negative (P<0.000).

Table-IV: Clinical sign symptom of the COVID-19 suspected participants (n=3120)

Characteristics	COVID-19 positive (n = 1144)	COVID-19 negative (n = 1976)	Total (n = 3120)	P Value ^a
Symptoms				
Asymptomatic	304 (26.6%)	1093 (55.3%)	1397 (44.8%)	<0.000 ^a
Symptomatic	840 (73.4%)	883 (44.7%)	1723 (55.2%)	
Symptoms				
Fever	534 (46.7%)	436 (22.1%)	970 (31.1%)	<0.000 ^a
Headache	309 (27.0%)	317 (16.0%)	626 (20.1%)	<0.000 ^a
Cough	499 (43.6%)	498 (25.2%)	997 (32.0%)	<0.000 ^a
Breathlessness	178 (15.6%)	251 (12.7%)	429 (13.8%)	<0.027 ^a
Sore Throat	350 (30.6%)	89 (4.5%)	439 (14.1%)	<0.000 ^a
Fatigue	290 (25.3%)	88 (4.5%)	378 (12.1%)	<0.000 ^a
Body ache	308 (26.9%)	98 (5.0%)	406 (13.0%)	<0.000 ^a
Other Symptoms	07 (0.6%)	61 (3.1%)	68 (2.2%)	<0.000 ^a

Exposure characteristics of the COVID-19 suspected participants

From the table 5, it is clear that among the all respondents, 23.4% had the history to travel in any COVID-19 infected area in the last 14 days before illness onset. There was statistically significant difference between COVID-19 positive and COVID-19 negative regarding the travel history ($p < 0.000$). On the other hand, in case of contact history with a confirmed case in the last 14 days prior to symptoms onset, and visit in health care facility in the last 14 days prior to symptom onset have significant difference for being COVID-19 positive and COVID-19 negative ($p < 0.000$).

Table-V: Travel History in COVID-19 infected area in the last 14 days before illness onset

Characteristics	COVID-19 positive (n = 1144)	COVID-19 negative (n = 1976)	Total (n = 3120)	<i>P</i> Value ^a
Recent travel history within 14 days of symptoms to COVID affected Area				
Yes	268 (23.4%)	81 (4.1%)	349 (11.2%)	<0.000 ^a
No	740 (64.7%)	1607 (81.3%)	2347 (75.2%)	
Unknown	136 (11.9%)	288 (14.6%)	424 (13.6%)	
Contact history with a confirmed case in the last 14 days prior to symptom onset				
Yes	292 (25.5%)	659 (33.4%)	951 (30.5%)	<0.000 ^a
No	660 (57.7%)	935 (47.3%)	1595 (51.1%)	
Unknown	192 (16.8%)	382 (19.3%)	574 (18.4%)	
Visit in Health Care Facility in the last 14 days prior to symptom onset				
Yes	95 (8.3%)	19 (1.0%)	114 (3.7%)	<0.000 ^a
No	1049 (91.7%)	1957 (99.0%)	3006 (96.3)	

Discussion

COVID-19 is a brutal disease that should be quickly diagnosed, controlled, and treated. As a part of quickly diagnosis, it is very important to rapidly collect and test the appropriate specimen from the people who suspected for COVID-19. All the samples for this study have been taken from the respiratory tract and it has been proven that respiratory sample for RT-PCR test have the greatest yield rather than the other specimen like blood, stool etc.^{5,6,7} A total 3120 suspected people for SARS-CoV-2 has been taken as the study sample for this study who were come to the TMSS Medical College and Rafatullah Community Hospital for RT-PCR test between the 1st May to 30th June, 2020. Most of the respondents were from the Bogura District and very few respondents were from the adjacent district of Bogura like Jaypurhat, Gaibandha, Nator etc. Among them, 76.3% were the male. The number of males is comparatively high in this study compare to some previous studies conducted by Biswas S. et al⁸, where it was 58.8%, another study done by Li Q et al, where it was 56%;² but more than the study done by Tao Al et al⁹ and Zhang JJ et al¹⁰ where the percentages were 46% and 50.7% respectively. Among the total participants, 24.6% were below 30 years old and maximum 38.8% were the service holder (non-medical). On the other hand, more than 61% were from the urban area. Here in this study, we analyzed recent 3120 cases by laboratory diagnosis of suspect SARS-CoV-2 infection in one hospital in Bogura, Bangladesh, showing 36.7% positive percentage for total population, what is quite high in comparison with the findings of the others study conducted in Bangladesh such as the study of Biswas S. 26.9% positive⁸. But Our finding is almost same to the study conducted by Rui Liu et al¹¹ what is 38.4%. Though the national rate for Bangladesh is too low of positive RT-PCR for COVID-19 and which was almost 19% till 30 June 2020¹¹.

The mean age of the of the COVID-19 positive patients was 43.5 years where the mean was 39.43 years for the COVID-19 negative people and most of them were 40-59 years old. Though according to the study of Biswas S. et al⁸, the mean age of the COVID-19 positive patients was 39.6 years. But some

international study has the same findings regarding the mean age and range of the age.⁹ Another important finding is that the percentage of male was the higher than the female suspect for COVID-19 positive. In case of occupation of the suspected, service holders and businessmen were the highest number to be the COVID-19 positive. The causes behind the finding is that this hospital is private so high price need to pay for RT-PCR test. That's why majority of the suspected person are from the economically solvent.

Among the COVID-19 positive participants, 73.4 percent were symptomatic means they had one or more symptoms of COVID-19 such as fever, headache, cough, breathlessness, sore throat, fatigue, body ache etc.

Conclusion

Preparedness is the key to address any health crisis, and so far, Bangladesh, as a lower-middle-income country, has numerous limitations in controlling the spread of the SARS-COV-2 virus. In that case, from the very beginning of the spreading of this virus, high priority should be given to identify the positive cases for COVID-19 suspect. RT-PCR for SARS-CoV-2 is the most useful mechanism to identify the confirm COVID-19 cases. High positivity rate among the suspected people indicates the high transmission of infection. So, to control the spreading of this virus, immediate action needs to be taken urgently.

References

1. Worldometers. Covid-19 Pandemic Update. [https:// www.worldometers.info/ coronavirus/](https://www.worldometers.info/coronavirus/) (accessed in June 10, 2020)
2. Li Q, Guan X, Wu P, Wang X, Zhou I, Tong Y et al. early Transmission dynamics in Wuhan, China of Novel Coronavirus- infected pneumonia. *N Engl J Med*.2020; 382:1199-207. doi: 10.1056/NEJMoa 2001316.
3. Bootsma MCJ, Ferguson NM. The effect of public health measures on the 1918 influenza pandemic in U.S. cities. *Proc Natl Acad Sci USA*. (2007) 104:7588-93. doi: 10.1073/pnas.0611071104
4. IEDCR. Bangladesh Covid-19 Update [https:// www.iedcr.gov.bd/](https://www.iedcr.gov.bd/) (accessed in June 10, 2020)

5. National Guidelines on Clinical Management of Coronavirus Disease 2019 (COVID-19). Directorate General of Health Services, Government Republic of Bangladesh. Version 7.0. 28th May, 2020:11.
6. X Kaijin, C Hongliu, S Yihong et al. Management of Corona Virus Disease-19 (COVID-19): The Zhejiang experience. Jour Zhejiang Univ. DOI: 10.3785/j.issn.1008-9292.2020.02.02.
7. Wei Zhang, Rong Hui, du, Bei Li et al. Molecular and serological investigation of 2019 n COV infected patients: implication of multiple shedding routes, Emerging Microbes and Infections, 9:1, 386-389.9<http://www.tandfonline.com/doi/full/10.1080/22221751.2020.1729071>.
8. Biswas S, Azad KA, Hoque MM, Mowla SG, Banu S, Sharmin R, et al. Real Time-PCR (RT-PCR) positivity for SARS-CoV-2 in suspected COVID-19 patients presented in a tertiary care hospital. Journal of BCPS. 2020; 38:67–70, [http:// dx.doi.org/ 10.3329/ jbcps. v38i0.47439](http://dx.doi.org/10.3329/jbcps.v38i0.47439).
9. Tao Al, Zhenlu Yang, Hongyan Hou, Chenao Zhan, Chong Chen et al. Correlation of Chest CT and RT-PCR Testing in Coronavirus Disease 2019 (COVID-19) in China: A report of 1014 cases. Radiology.2020 Feb 26. DOI; 10.1148/radiol.2020200642.
10. JJ Zhang, X Dong, YY Cao, YD Yuan et al. Clinical Characteristics of 140 patients infected by SARS COV-2 in Wuhan, China. Allergy. 2020.doi: 10.1111/all.14238.
11. [https:// corona.gov. bd/storage/press- releases/ June2020/ twBHDaQq Nwjn808p637 A.pdf](https://corona.gov.bd/storage/press-releases/June2020/twBHDaQqNwjn808p637A.pdf)

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