

Research Article

Outcome of RT-PCR in the Diagnosis of Patients with COVID-19 Symptoms: A Study in a COVID-19 Referral Hospital

Mohammad Mojibur Rahman*, **Abdur Rab Akanda**, **Mohammad Motiur Rahman**, **Mohammad Salehin Abedin**, **Sohel Rana Sumon**, **Mohammad Ripon Sikder**, **Marzuk Ahamed**

Department of Public Health and Life Science, University of South Asia, Dhaka, Bangladesh

Abstract

Introduction: Corona virus (SARS-CoV-2) (COVID-19) outbreak was first reported in China rapidly spread around the world within short period causing global public health emergency. COVID 19 is a highly infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The initial symptoms were fever, cough, dyspnea, myalgia or fatigue, headache, hemoptysis, diarrhea and acute respiratory distress syndrome (ARDS). Hence in diagnosis of COVID-19 RT-PCR of viral nucleic acid is regarded as the reference standard to detect the COVID-19 positive cases. **Objective:** The aim of this study was to determine the outcome of RT-PCR of the patients with COVID-19 symptoms. **Methodology:** This was a cross-sectional prospective study carried out in the department of Radiology and imaging in collaboration with the department of Virology and COVID unit in IbnSina Hospital, Dhaka, Bangladesh during January, 2022 to June, 2022. A total of 239 OPD patients with COVID-19 symptoms aged above 18 years were enrolled in this study. The collected data were cleaned, edited and entered into computer for analysis. The data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh. **Results:** In this study a total of (n=239) patients with COVID-19 symptoms were enrolled. According to age distribution, the majority, 142 (59.42%) patients belonged to the age group >52 years, which was the highest and followed by 44 (18.42%) age group (43-52) years, 36 (15.06%) (33-42) years, 14 (5.85%) (22-32) years and 3 (1.25%) <22 years. According to sex distribution, the majority, 167 (69.85%) were male and 72 (30.12%) were female. Distribution by symptoms, all the patients 239 (100%) had general weakness and followed by sneezing 221 (92.46%), fever 236 (98.74%), headache 228 (95.39%), cough 232 (97.07%), respiratory distress, 225 (94.14%), cough and SOB, 237 (99.16%), loss of smell, 212 (88.74%), lac of apatite, 224 (73.72%), asthma 218 (91.21%) and pneumonia, 118 (49.37%). In RT_PCR lab test results, the majority 195 (81.58%) were observed COVID-19 Negative (-) and 44 (18.41%) were observed COVID-19 Positive (+). Among the positive cases, the majority 26 (60%) were male and 18 (40%) were female. **Conclusion:** This study prevailed around 20 % of the patients with COVID-19 symptoms got COVID-19 Positive in RT-PCR lab test results. Therefore, the patients with COVID-19 symptoms must conduct RT-PCR lab test for their being sure of their COVID-19 affection. At the same time, the male are more vulnerable to COVID-19 than their counter part female.

*Corresponding author: majiburrahmaniht@gmail.com (Mohammad Mojibur Rahman)

Received: 2 November 2023; **Accepted:** 27 November 2023; **Published:** 24 May 2024



Copyright: © The Author(s), 2024. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Keywords

Outcome, RT-PCR, COVID-19, Symptoms Referral

1. Introduction

Corona virus (SARS-CoV-2) (COVID-19) outbreak was first reported in China rapidly spread around the world within short period causing global public health emergency. COVID 19 is a highly infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) [1-3]. The initial symptoms were fever, cough, dyspnea, myalgia or fatigue, headache, hemoptysis, diarrhea and acute respiratory distress syndrome (ARDS) [4, 5] World Health Organization (WHO) declared this pandemic as a global health emergency on February-2020 [6]. First case was reported on 8th March 2020, in Bangladesh and first death was recorded on 18th March 2020. Young professionals, and working people have so far been mostly infected with COVID-19. Specifically, IEDCR reported that 68% of COVID-19 positive cases were observed in people aged between 21 to 50 years. On the other side, infected patients aged >50 years constituted 21% of the total infected people. The children and youths aged <20 years comprised 11% of total infected cases [7]. There is a similarity of the age distribution of COVID-19 positive patients between Bangladesh and India, but differs with that of the USA and Italy where it has been broken out more drastically. In India, 75.09% of the confirmed patients were less than 50 years old. The working age population was infected mostly so far in India. On the other hand, only 27.2% people aged between 19 to 50 years have been infected with COVID-19 in Italy. In the USA, COVID-19 infected people, aged over 50 years old, accounted for 50.63% [8]. According to WHO, the countries with vulnerable health systems are at higher risk? As of August 11, 2020, the disease has infected at least 20417,377 people and has resulted in at least 742,311 deaths globally [9]. The emergency committee of WHO announced that the spread of COVID-19 could be discontinued by trace, early detection, isolation, and prompt treatment. However, Bangladesh has never faced a situation like this before. In fact, health care systems of Bangladesh were not prepared to face this pandemic outbreak. [10]. COVID-19 is not only a public health concern or medical issue but also it requires a multi-disciplinary planning and approach. Molecular diagnostic procedure against any infectious disease is very limited in Bangladesh. Therefore, tackling this newly introduced disease requires comprehensive planning and approaches including the medical, virological and epidemiological interventions [11]. Hence in diagnosis of COVID-19 RT-PCR of viral nucleic acid is regarded as the reference standard to detect the COVID-19 positive cases. Therefore, the researcher has designed this study. The aim of this study was to determine the

outcome of RT-PCR of the patients with COVID-19 symptoms.

2. Objectives

2.1. General Objective

To determine the outcome of RT-PCR Test of the patients with COVID-19 symptoms.

2.2. Specific Objectives

- 1) To determine the clinical and demographic characteristics of the patients with COVID-19 symptoms
- 2) To know the Positive and Negative cases by RT-PCR test.
- 3) To identify the male-female proportion of positive cases.

3. Methodology

This was a cross-sectional prospective study carried out in the department of Radiology and imaging in collaboration with the department of Virology and COVID unit in Ibne Sina Hospital, Dhaka, Bangladesh during January, 2022 to June, 2022. The purpose, benefits and risks of this study were disclosed to the participants/care givers in local language. Written informed consent was obtained from the study subjects/care givers and a total of 239 OPD patients with COVID-19 symptoms aged above 18 years were enrolled in this study. A purposive random sampling technique was used. All the patients were under went RT-PCR lab test. The data were collected through a pre-structured Case Record Form (CRF). The collected data were cleaned, edited and entered into computer for analysis. The data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. Inferential statistical analysis were performed and the results were presented as frequency and percentage in tables and charts. The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh. The formal permission was also taken from the director and registrar of Ibne Sina Hospital, Dhaka, Bangladesh. The inclusion and exclusion criteria of this study were as follows:

3.1. Inclusion Criteria

- 1) OPD patients with COVID-19 symptoms
- 2) Patients come to conduct RT-PCR test
- 3) Aged above 18 years

3.2. Exclusion Criteria

- 1) Non COVID-19 Cases
- 2) Disagreed to conduct RT-PCR test
- 3) Aged < 18 years

4. Results

Table 1 shows the age distribution of the study subjects. 142 (59.42%) patients belonged to the age group >52 years, which was the highest and followed by 44 (18.42%) age group (43-52) years, 36 (15.06%) (33-42) years, 14 (5.85%) (22-32) years and 3 (1.25%) <22 years.

Table 1. Age distribution of the study subjects (n=239).

Age in years	Frequency	Percentage
< 22	3	1.25
22-32	14	5.85
33-42	36	15.06
43-52	44	18.42
>52	142	59.42
Total	239	100

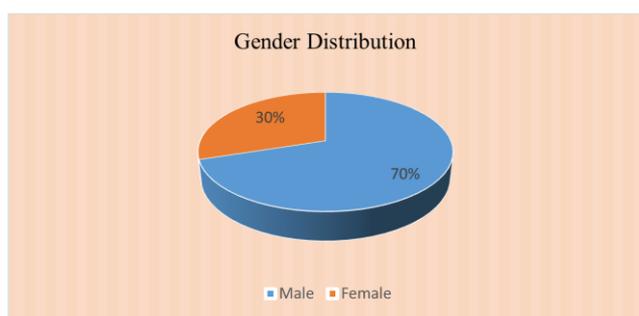


Figure 1. Shows the gender distribution of the study subjects (n=239).

Figure 1 shows the gender distribution of the study subjects. Among the patients with COVID-19 symptoms, 167 (69.85%) were male and 72 (30.12%) were female.

Table 2. Clinical presentation of the study subjects (n=239).

Clinical Presentation	Frequency	Percentage
Cough	232	97.07
Fever	236	98.74
Cough and SOB	237	99.16
Respiratory distress	225	94.14
Headache	228	95.39
pneumonia	118	49.37
Loss of smell	212	88.70
Asthma	218	91.21
Sneezing	221	92.46
Lac of apatite	224	73.72
General weakness	239	100

Table 2 shows distribution of clinical presentation of the study subjects. Among the patients with COVID-19 symptoms, the highest symptom was observed, general weakness 239 (100%) and followed by sneezing 221 (92.46%), fever 236 (98.74%), headache 228 (95.39%), cough 232 (97.07%), respiratory distress, 225 (94.14%), cough and SOB, 237 (99.16%), loss of smell, 212(88.74%), lac of apatite, 224 (73.72%), asthma 218 (91.21%) and pneumonia, 118 (49.37%).

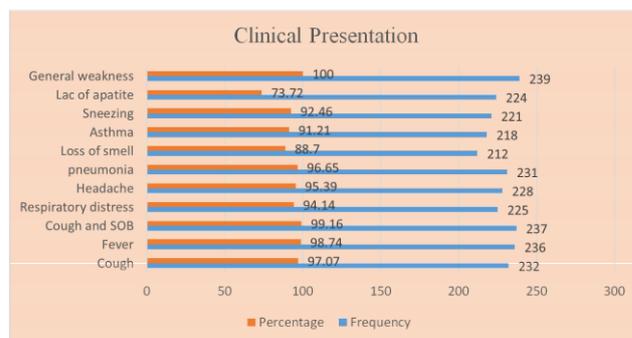


Figure 2. Shows the distribution of clinical presentation the study subjects (n=239).

Table 3. RT-PCR test results of the study subjects (n=239).

RT-PCR Results	frequency	Percentage	p-value
Positive counted (+)	44	18.41	<0.001
Negative counted (-)	195	81.58	

Table 3 shows the RT-PCR lab test results of the patients

with COVID-19 symptoms. The majority 195 (81.58%) were observed COVID-19 Negative (-) and 44 (18.41%) were observed COVID-19 Positive (+).

Table 4. Gender distribution of COVID-19 Positive Cases (n=44).

Gender Distribution of COVID-19 Positive Cases	Frequency	Percentage
Male	26	60
Female	18	40

Table 4: shows the gender distribution of COVID-19 Positive Cases by RT_PCR lab test. Among the positive cases, the majority 26 (60%) were male and 18(40%) were female.

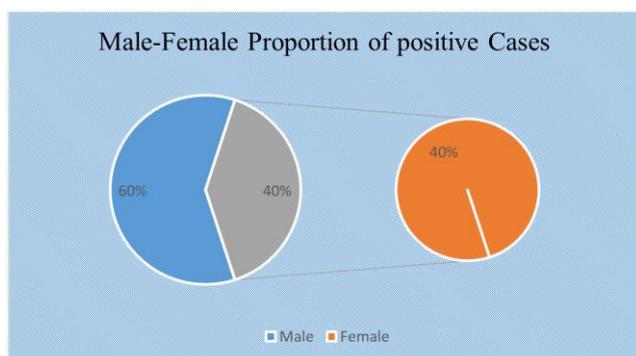


Figure 3. Shows the distribution of proportion of male-female of the COVID-19 positive cases (n=44).

5. Discussion

This cross-sectional study was conducted with the patients who had COVID-19 symptoms and came to a tertiary care hospital for RT-PCR lab test. In this study a total of 239 patients with COVID-19 symptoms were enrolled. Among the patients, The majority of the patients 142 (59.42%) belonged to the age group >52 years, which was the highest and followed by 44 (18.42%) age group (43-52) years, 36 (15.06%) (33-42) years, 14 (5.85%) (22-32) years and 3 (1.25%) <22 years. This findings of our study indicates, the majority of the people who came to hospital with COVID-19 symptoms were old and middle aged. Almost the similar findings were observed in another studies [12]. In our study, the majority of the patients were observed 167 (69.85%) were male and the minimum 72 (30.12%) were female. This findings indicate, the male were more vulnerable to COVID-19 symptoms than the female. The cause of this happenings may be long time staying at outdoor works of the male than the female. More male patients than female were also observed in some other studies [13]. This current study observed, among the patients with COVID-19 symptoms,, the highest

symptom was observed, general weakness 239 (100%) and followed by sneezing 221 (92.46%), fever 236 (98.74%), headache 228 (95.39%), cough 232 (97.07%), respiratory distress, 225 (94.14%), cough and SOB, 237 (99.16%), loss of smell, 212 (88.74%), lac of apatite, 224 (73.72%), asthma 218 (91.21%) and pneumonia, 118 (49.37%) [14]. These findings of our study denotes, patients having those symptoms were not all COVID-19 positive cases but minimum of the patients were COVID-19 positive but fever and respiratory symptoms were most common among the patients, reported in other studies in Bangladesh while several studies from Bangladesh, China and Brazil reported weakness or fatigue as a common symptom of COVID-19 positive cases [15-17]. This present study observed the RT-PCR lab test results of the patients with COVID-19 symptoms. The majority 195(81.58%) were observed COVID-19 Negative (-) and 44(18.41%) were observed COVID-19 Positive (+) (p<0.001) which was statistically significant. The RT-PCR lab test results of the patients with COVID-19 symptoms claimed, all the patients with COVID-19 symptoms were not COVID-19 positive only a minimum of them were COVID-19 positive [18]. These results of our study is persistent with another study conducted in China in February, 2020 by Ai Tang et al. In their study, they observed 56 (18.72%) (n=299) patients were COVID-19 positive in RT-PCR lab test who came to the hospital with COVID-19 symptoms. Our study observed, among the positive cases, the majority 26 (60%) were male and 18 (40%) were female [19, 20]. This findings of our study prevailed, the male are more vulnerable to COVID-19 than their counter part [21]. The similar male-female proportion or a minimal increase or decrease was observed in some other studies. However, finally, this present study suggests, around 20% of the patients with COVID-19 symptoms in RT-PCR lab test got COVID-19 Positive (+) and 80% Negative (-) and male proportion is always more than their counter part female. This study also suggest, all the concerned with COVID-19 symptoms must conduct RT-PCR lab test for being sure of their COVID-19 infection [21, 22]. At the same time, they should not feel worried because all patients with COVID-19 symptoms did not have COVID-19 Positive in RT-PCR lab test results.

6. Conclusion

This study prevailed around 20 % of the patients with COVID-19 symptoms got COVID-19 Positive in RT-PCR lab test results. Therefore, the patients with COVID-19 symptoms must conduct RT-PCR lab test for their being sure of their COVID-19 affection. At the same time, the male are more vulnerable to COVID-19 than their counter part female.

7. Limitations of the Study

This was a single center study with a limited purposive sample size and short study duration. So, the findings of this study may not reflect the whole country.

8. Recommendations of the Study

A further study on HRCT outcome of chest may be conducted with both Negative and Positive cases so that we could be surer of COVID-19 infection as well as to know the real condition of lungs infection of the patients with COVID-19 symptoms.

Ethical Approval

The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *New Engl J Med* 2020; 382: 727-33. [PMC free article] [PubMed] [Google Scholar]
- [2] Wang C, Horby PW, Hayden FG, et al. A novel coronavirus outbreak of global health concern. *Lancet* 2020; 395: 470-3. [PMC free article] [PubMed] [Google Scholar]
- [3] Lu H, Stratton CW, Tang YW. Outbreak of pneumonia of unknown etiology in Wuhan China: the mystery and the miracle. *J Med Virol* 2020; 92: 401-2. [PMC free article] [PubMed] [Google Scholar]
- [4] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; 395: 497-506. [PMC free article] [PubMed] [Google Scholar]
- [5] Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020; 395: 507-13. [PMC free article] [PubMed] [Google Scholar]
- [6] Sohrabi C, Alsafi Z, O'Neill N, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *Inter J Surg* 2020; 76: 71-6. [Google Scholar]
- [7] Institute of Epidemiology Disease Control and Research (IEDCR). Bangladesh Covid-19 update. 2020. Available from: <https://www.iedcr.gov.bd/> [Google Scholar]
- [8] Maswood MH. Young, working-age people mostly infected with COVID-19 in Bangladesh. 2020. Available from: <https://www.newagebd.net/article/104307/young-working-age-people-mostly-infected-with-covid-19-in-bangladesh> [Google Scholar]
- [9] Worldometer. COVID19 Coronaviruspandemic. 2020. Available from: <https://www.worldometers.info/coronavirus/> [Google Scholar]
- [10] Anwar S, Nasrullah M, Hossen MJ. COVID-19 and Bangladesh: challenges and how to address them. *Front Pub Health* 2020; 8:154. [PMC free article] [PubMed] [Google Scholar]
- [11] Lorenzo GD, Rossella DT. Coronavirus disease (covid-19) in Italy: analysis of risk factors and proposed remedial measures. *Front Med* 2020; 7: 140. [PMC free article] [PubMed] [Google Scholar]
- [12] Nasir N, Habib K, Khanum I. Clinical characteristics and outcomes of COVID-19: experience at a major tertiary care center in Pakistan. *J Infect Dev Ctries* 2021; 15: 480-9.
- [13] CA, Haritha D, Soni L, et al. Epidemiological & clinical characteristics & early outcome of COVID-19 patients in a tertiary.
- [14] Saha A, Ahsan MM, Quader MT-U, et al. Clinical characteristics and outcomes of COVID-19 infected diabetic patients admitted in ICUs of the southern region of Bangladesh. *Diabetes Metab Syndr* 2021; 15: 229-35.
- [15] Md S M, Mosabbir AA, Chowdhury P. Clinical manifestations of patients with coronavirus disease 2019 (COVID-19) attending at hospitals in Bangladesh. *Infectious Diseases* 2020.
- [16] Ali MR, Hasan MA, Rahman MS, et al. Clinical manifestations and socio-demographic status of COVID-19 patients during the secondwave of pandemic: a Bangladeshi experience. *J Infect Public Health* 2021; 14: 1367-74.
- [17] Mahmud R, Rahman MM, Rassel MA, et al. Post-COVID-19 syndrome among symptomatic COVID-19 patients: a prospective cohort study in a tertiary care center of Bangladesh. *PLoS One* 2021; 16: e0249644.
- [18] Li L-Q, Huang T, Wang Y-Q, et al. COVID-19 patients' clinical characteristics, discharge rate, and fatality rate of meta-analysis. *J Med Virol* 2020; 92: 577-83.
- [19] Moura DTHde, Proença IM, McCarty TR, et al. Gastrointestinal manifestations and associated health outcomes of COVID-19: a Brazilian experience from the largest South American public hospital. *Clinics* 2020; 75: e2271.
- [20] Ai Tang Xiao, Yi Xin Tong, Sheng Zhang, Profile of RT-PCR for SARS-CoV-2: A Preliminary Study From 56 COVID-19 Patients, *Clinical Infectious Diseases*, Volume 71, Issue 16, 15 October 2020, Pages 2249-2251, <https://doi.org/10.1093/cid/ciaa460>
- [21] ARDS Definition Task Force, Ranieri VM, Rubenfeld GD, et al. Acute respiratory distress syndrome: the Berlin definition. *JAMA* 2012; 307: 2526-33.
- [22] Kayina CA, Haritha D, Soni L, et al. Epidemiological & clinical characteristics & early outcome of COVID-19 patients in a tertiarycare teaching hospital in India: A preliminary analysis. *Indian J Med Res* 2020; 152: 100-4.