Coronavirus Pandemic

Analysis of the primary presenting symptoms and hematological findings of COVID-19 patients in Bangladesh

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Abstract

Introduction: SARS-Cov-2 infection or COVID-19 is a global pandemic. In this manuscript, we investigated the primary symptoms and basic hematological presentations of SARS-CoV-2 infection among the Bangladeshi patients.

Methodology: This was a multicentre cross-sectional study done on COVID-19 patients tested positive by RT PCR in Bangladesh. Clinical features of mild to moderate degree of COVID-19 patients; hematological and biochemical admission day laboratory findings of moderate to severe degree hospitalized COVID-19 patients were analyzed.

Results: COVID-19 patients in Bangladesh commonly presented with fever, cough, fatigue, shortness of breath, and sore throat. But symptoms like myalgia, diarrhea, skin rash, headache, Abdominal pain/cramp, nausea, vomiting, restlessness, and a higher temperature of >100°F have a greater presentation rate and more frequent than other published studies. CRP and Prothrombin time was found to increase in all the patients. Serum ferritin, ESR, SGPT, and D-Dimer were increased among 53.85%, 80.43, 44%, and 25% patients. 17.39% of the patients had leucocytosis and neutrophilia, 28.26% presented with lymphocytopenia, and 62.52% had mild erythrocytopenia. The difference between the decrease hemoglobin count (higher in the male) and increased SGPT (higher in female) against gender was significant.

Conclusions: Our study had evaluated a different expression in presenting symptoms of COVID-19 patients in Bangladesh. CRP, Prothrombin time, serum ferritin, ESR, SGPT, D-Dimer, erythrocytopenia, and lymphocytopenia can be assessments for diagnosis and prognosis of COVID-19 disease. Decrease hemoglobin count (higher in the male) and increased SGPT (higher in female) establish these two markers as a good candidate for diagnostic value against gender.

Key words: SARS-CoV-2; COVID-19; real-time RT-PCR; COVID-19 symptoms; COVID-19 hematological findings; Bangladesh.

Introduction

SARS-Cov-2 infection or COVID-19 is a current global pandemic. This is a single-stranded RNA virus that originated from the beta Coronavirus family [1].The rapid spread of SARS-CoV-2 has led to the declaration of a global pandemic barely three months after emerging [2]. The disease was first notified in December 2019 in the Hubei province of the Republic of China as a cluster of 27 cases of pneumonia of an unknown cause [3]. All these patients presented with Radiological findings like glassy lung opacity, along with clinical presentations like fever, dyspnea, and dry cough. From the time of identification to till, multiple clinical symptoms and parameters have been identified by the researchers of various countries and regions regarding the diagnosis and presentations of COVID-19

disease. In this manuscript, we investigated the primary symptoms and hematological presentations of SARS-CoV-2 infection among Bangladeshi patients.

Methodology

This was a cross-sectional multicenter study; patients were enrolled between 5 May and 15 June 2020. For the analysis of the presenting symptoms of SARS-CoV-2 infection, the data of COVID-19 patients were obtained from Chattogram Civil Surgeon's office, and the Chakoria Upazilla Health and Family Welfare Officer's office (UH&FPO). Patients were tested positive for SARS-CoV-2 by RT-PCR at Bangladesh Institute of Tropical and Infectious Disease (BITID), Chattogram Medical College hospital, and Cox's Bazar Medical College Hospital. All of them were treated

(either as an outpatient or as an inpatient with various degrees of illness) under different COVID-19 dedicated hospitals in Chattogram district, and Chokoria Upazilla Health complex. Each of the patients was individually interviewed over the phone to find out the details of the disease symptoms, history, comorbid condition, and associated complaints. Patients with pre-existing comorbid conditions like severe Bronchial asthma, COPD exacerbation, advanced ischemic heart disease, severe uncontrolled diabetes mellitus, advanced renal and hepatic disease; patients with carcinoma, pre-hospitalized and Immuno-compromised patients were not included in this study. To evaluate the hematological changes in hospitalized patients with moderate to severe degree COVID-19 disease "admission day" laboratory findings were assessed. These included Hemoglobin level, Erythrocyte Sedimentation rate, total and differential count of WBC, RBC, Platelet, C-Reactive Protein (CRP), SGPT, Serum Ferritin, Prothrombin time, D-Dimer, and Serum creatinine. Patients with fever were tested for Dengue NS1 antigen, Dengue IgG & IgM antibody, Salmonella Typhi IgM and IgG antibody, ICT for malaria (Antigen for Plasmodium Falciparum, Vivax, Malaria, and Ovale) and Widal test to exclude Dengue, Malaria, and Enteric fever. Patients who had a chronic comorbid condition and any recent history of hematological, biochemical, or chest radiograph abnormality within a period of 30 days were not included in this study. In our observation, all patients with critical illness admitted in a high dependency unit (HDU) and the intensive care unit (ICU) had pre-existing comorbid conditions. Therefore only the laboratory findings of moderate to severe COVID-19 patients were enrolled. Informed

consent was obtained in every case. In the case of less than 16 years of age, consent was taken from the guardian. Statistical analysis was done by Graph pad Prism software. Column statistics and unpaired t-test were done to see the significance of the values among the groups.

Results

A total of 727 COVID-19 positive patients' data were primarily included in this study. For the analysis of the presenting symptoms, 638 patient's data that were tested positive for COVID-19 between 5 May and 5 June 2020 were collected. Due to unreliable statements (127 patients), the existence of comorbid conditions, or pre-existing symptoms (138 patients) total of 256 patient's data were discarded. 53 patients did not respond to our call or were unwilling to participate in the study. Following exclusion, for symptomatic analysis, 320 patients of 13 to 56 years (mean 35.81 years) of age were included in this study.

To evaluate the hematological changes in COVID-19 disease, the hematological and biochemical reports of 89 hospitalized patients were analyzed. After exclusion, 50 patients (37 males and 13 females of 31 to 59 years of age; mean 42.8 years) laboratory findings were included for the final analysis (Table 1).

The total number of patients of presenting symptoms of COVID-19 in Bangladesh were 320; 208 (65%) were male and 112 (35%) were female; age 13 to 56 years, mean 35.81 ± 11.68 years (Figure 1 A). The mean age of male and female patients was 34.16 ± 11.08 years and 38.89 ± 12.19 years respectively (Figure 1 B). Among them, 129 (40.31%) were under hospital and 191 (59.69%) were under home isolation. Out of 320 patients, 262 (81.88%) were symptomatic and 58 (18.13%) were asymptomatic. The age of male and female symptomatic patients was 34.15 ± 11.07 years and 38.89 ± 12.19 years respectively. The duration of presenting symptoms was 5.66 ± 3.60 days in general. In the case of male patients, this was 5.72 ± 3.50 days and female was 5.56 ± 4.0 days (Figure 1 C).

Sub-group analysis of hospital/home isolated patients

Among the hospitalized patients 107 (82.3%) were male, 23 (17.82%) were female; this was 141 (71.57%) and 50 (26.18%) were at home isolation (Figure 1 D). T-tests were not significant among these groups. The number of patients according to the age group was as following: 10 to 20 years, 30 patients; 21 to 30 years, 53 patients; 31 to 40 years, 127 patients; 41 to 50 years, 71 patients; and 51 to 60 years, 39 patients (Figure 1 E).

Table 1. Baseline characteristics of patients for analysis of symptomatic presentations.

Parameters	Number
Number of Patients	320
Male	208 (65%)
Female	112 (35%)
Age (mean ± SD)	35.81±11.07
Age of Male patients (mean ± SD)	34.15±11.07
Age of Female patients (mean ± SD)	38.89 ± 12.19
Asymptomatic	58 (18.12%)
symptomatic	262 (81.88%)
Hospitalized	129 (40.31%)
Home isolation	191 (59.69%)
Duration of symptoms (days ± SD)	5.66 ± 3.60
Male, Duration of symptoms (days ± SD)	5.72 ± 3.50
Female, Duration of symptoms (days ± SD)	5.56 ± 4.0
Body temperature <100^0 F	68 (30.90%)
Body temperature >100^0 F	152 (69.09%)
Comorbid condition (n)	152 (47.50%)

Two hundred and twenty (68.8%) patients presented with fever, weakness 134 (41.9%), cough 126 (57.3%), anorexia 117 (36.6%), myalgia 112 (35.0%), diarrhea 98 (30.6%), nausea 94 (29.4%), chest tightness 93 (42.3%), sleep disturbance 83 (25.9%), headache 75 (23.4%), sore throat 63 (19.7%), respiratory distress 61 (19.1%), rhinorrhea 53 (16.6%), abdominal crump/ pain 53 (16.6%), small localized rash on the body (with or without itching) 47 (14.7%), vomiting 29 (9.1%), and vertigo 11 (3.4%) (Figure 2 A, B).
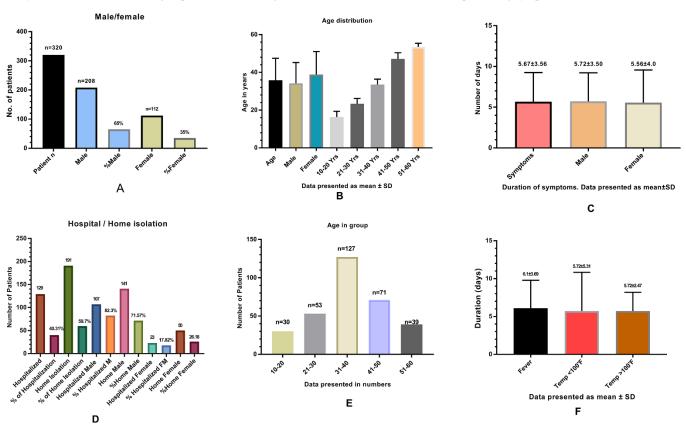
The maximum temperature was found 104°F. 220 patients had a history of fever (Figure 2 D). Out of them, 68 patients had temperatures <100°F, and 152 presented with >100 °F temp (Table 1). Febrile patients had 2 to 14 days, mean 6.09±3.69 days of fever history. Patients with <100 °F temperature had a history of 5.72 ± 5.13 days (2 to 14 days) and patients with >100 °F temperature had a history of 5.73±2.47 days (2 to 10 days) of febrile history (Figure 1 F). 126 patients had a history of cough. 103 (81.75%) experienced dry cough and 23 (18%) complained of sputum with the cough;

among them, 93(73%) were male and 34 (26.95%) were female (Figure 2 E).

In general, the overall duration of COVID-19 symptoms was 2 to14 days (mean 5.67±3.60); males 5.72±3.5 days (2-13 days), and females 5.56±4.0 days (2-14 days). These figures were not significant in the t-test, P=0.998. Among the hospitalized patients 107 were male patients of 22 to 54 years (mean 37±10.95 years), 48 were female of 22 to 50 years (mean 36.88±8.13 years). In the case of home isolation, this was 34.16±10.93 years (17 to 54 years) in males and 39.82±9.84 (24 to 56years) in females (Figure 2 F).

Fever was presented by 220 patients, among them were 157 males (71.36%) and females were 63 (28.64%); this was 95.73% and 64.29% against total symptomatic male and female patients (Table 2). Weakness was presented by 134 patients, 98 male (73.13%), and 36 female (26.87%); this was 59.76% and 36.73% against total symptomatic male and female patients.
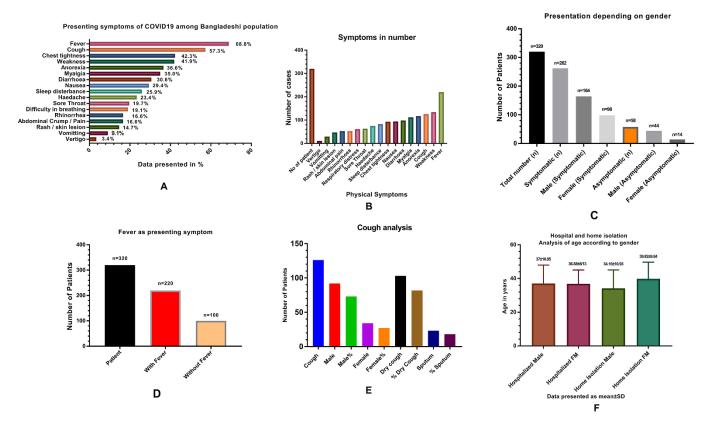
Figure 1. A: Number of total patients and gender difference of infected in number and percentage. B: Variation in age according to gender and age group. C: Duration of presenting symptoms in general and according to gender. D: Percentage of hospitalized and home isolation-treatment according to gender. E: Number of the COVID19 patients according to age group. Note: 31 to 40 years is the highest and 10 to 20 years is the lowest affected group. F: Duration and grade of fever (<100°F and >100°F) as presenting symptom of COVID19 disease.

Table 2. Symptomatic presentation according to gender variation. The total number of patients n=320.

Symptoms	No. of Patients	Male	Female	% Against male Symptomatic Patients, n=164	% Against female Symptomatic Patients, n=98
Fever	220	157 (71.36%)	63 (28.64%)	95.73%	64.29%
Weakness	134	98 (73.13%)	36 (26.87%)	59.76%	36.73%
Cough	126	92 (73.01%)	34 (26.87%)	56.10%	34.69%
Anorexia	117	81 ((69.23%)	36 (30.77%)	49.39%	36.73%
Myalgia	112	87 (77.68%)	25 (22.32%)	53.05%	25.51%
Diarrhoea	98	61 (62.24%)	37 (37.76%)	37.20%	37.76%
Nausea	94	69 (73.40%)	25 (26.60%)	42.07%	25.51%
Chest tightness	93	52 (55.91%)	41 (44.08%)	31.71%	41.84%
Sleep disturbance	83	51 (61.44%)	32 (38.55%)	31.10%	32.65%
Headache	75	58 (77.33%)	17 (22.67%)	35.37%	17.35%
Sore throat	63	30 (47.61%)	33 (52.38%)	18.29%	33.67%
Breathing difficulty	61	43 (70.49%)	18 (29.51%)	26.22%	18.37%
Rhinorrhea	53	30 (56.60%)	23 (43.31%)	18.29%	23.47%
Abdominal crump/pain	53	27 (50.94%)	28 (52.83%)	16.46%	28.57%
Skin rash	47	18 (38.30%)	29 (61.70%)	10.98%	29.59%
Vomiting	29	22 (75.86%)	7 (24.13%)	13.41%	7.14%
Vertigo	11	3 (27.27%)	8 (72.73%)	1.83%	8.16%
Restless	82(25.63%)	57 (69.51%)	25 (30.49%)	34.76%	25.51%

Figure 2. Presenting symptoms in percentage (A) and number (B) against the total of COVID19 patients included in this study. C: Symptomatic and asymptomatic cases of COVID19 patients in number. D: Presentation of the number of patients with or without fever against the total number of COVID19 patients included in this study. E: Analysis of cough (Dry and with sputum) as a presenting symptom. F: Age variation according to the gender in the case of Hospitalized and home isolated patients.
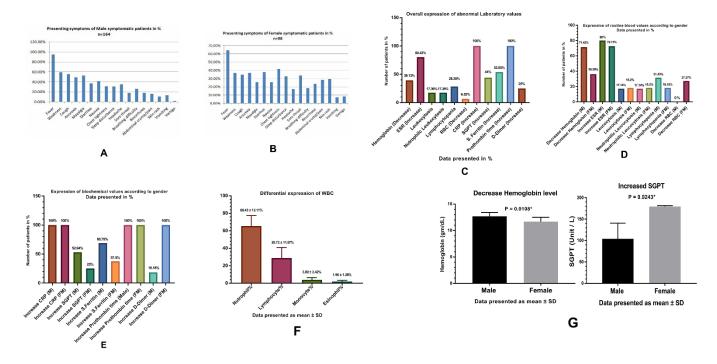
The cough was presented by 126 patients, 92 males (73.01%) and 34 females (26.87%); this was 56.10% and 34.69% against total symptomatic male and female patients. Anorexia was presented by 117 patients, 81 males (69.23%), and 36 females (30.77%); this was 49.39%% and 36.73% against total symptomatic male and female patients. Generalized Myalgia was presented by 122 patients, 87 male (77.68%), and 25 females (22.32%); this was 53.05% and 25.51% against total symptomatic male and female patients. Diarrhea was presented by 94 patients, 61 male (62.24%), and 25 female (26.60%); this was 37.20% and 37.76% against total symptomatic male and female patients. Nausea was presented by 98 patients, 61 male (62.24%), and 37 female (37.76%); this was 42.07% and 25.51% against total symptomatic male and female patients. Chest tightness was presented by 93 patients, 52 male (55.91%), and 41 female (44.08%); this was 31.71% and 41.84% against total symptomatic male and female patients. Sleep disturbance was presented by 83 patients, 51 male (61.44%), and 32 female (38.55%); this was 31.10% and 32.65% against total symptomatic male and female patients. Headache was presented by 75 patients, 58 male (77.33%), and 17 female (22.67%); this is 35.37% and 17.35% against total symptomatic male and female patients. Sore throat was presented by 63 patients, 30 male (47.61%), and 33 female (52.38%); this was 18.29% and 33.67% against total symptomatic

Table 3. Comorbid conditions n=152.

Name of disease	Number of patients and %
T2DM	47 (30.92%)
HTN	64 (42%)
IHD	17 (11.2%)
Sinusitis	13 (8.55%)
Bronchial Asthma	23 (15.13%)
HBV (+) Ve	10 (6.58%)
H/O Pulmonary TB	7 (4.61%)
T2DM and HTN	42 (13.13%)
T2DM, HTN, and IHD	9 (2.81%)
Others (Skin allergy, Migraine, Thyroid disease, etc)	20 (13.16%)

male and female patients. Breathing difficulty was presented by 61 patients, 43 male (70.49%), and 18 female (29.51%); this was 26.22% and 18.37% against total symptomatic male and female patients. Rhinorrhea was presented by 53 patients, 30 male (56.60%), and 23 female (43.31%); this was 18.29% and 23.47% against total symptomatic male and female patients. Abdominal cramp/pain was presented by 53 patients, 27 male (50.94%), and 28 female (52.83%); this was 16.46% and 28.57% against total symptomatic male and female patients. Skin rash was presented by 47 patients, 18 male (38.30%), and 29 female (61.70%); this was 10.98% and 29.59% against total symptomatic male and female patients. Vomiting was presented by 29

Figure 3. Presenting symptoms (in percentage) of male and female symptomatic patients (A and B). C: Differential count of WBC cells, presented as mean ± SD. D and E: Laboratory findings of the hematological changes (in percentage). F: Differential expression of WBC among the patients.G: Significant changes in decrease hemoglobin level and increased SGPT level in Male and Female patients.

patients, 22 male (75.86%), and 7 female (24.13%); this was 13.41% and 7.14% against total symptomatic male and female patients. Vertigo was presented by 11 patients, 3 male (27.27%), and 8 female (72.73%); this was 1.83% and 8.16% against total symptomatic male and female patients. Restlessness was presented by 82 patients, 57 male (69.51%), and 25 female (30.49%); this was34.76% and 25.51% against total symptomatic male and female patients (Figure 3 A, B).

As shown in Table 3, 152 (47.50%) patients had a comorbid condition. 47 (30.92%) had T2 DM, 64 (42%) had HTN, 23 (15.13%) had bronchial asthma, 17 (11.2%) had ischemic heart disease, 13 (8.55%) has sinusitis, 20 (13.16%) had other manifestations like a fungal infection, hypothyroid, hepatitis B (+)ve, etc. 42 (13.13%) had DM and HTN and 9 (2.81%) had DM-HTN-Ischemic Heart Disease.

Table 4. N=50; male 37 and female 13; mean age was 42.8 ± 8.268 years (31 to 59 years). Routine blood count was done on 46 patients, findings were as following: Hemoglobin 13.42 ± 1.324 gm/dL (11.5 to 16.3 gm/dL); ESR 29.52 ± 18.46 mm in 1st hour (4 to 46mm in 1st hour), WBC 6851 ± 2721/CC (4300 to 16000/CC), RBC 4.94 ± 0.65 Million/CC (3.75 to 5.94 Million/CC); Platelet 229804 ± 68932 /CC (160000-421000/CC), Neutrophil 65.43 ± 12.11% (48 to 85%); Lymphocyte 28.72 ± 11.97 % (20 to 45%), Monocyte 3.89 ± 2.42% (2 to 10%), Esinophil 1.96 ± 1.26% (0 to 5%), Basophil 0.065 ± 0.24% (0 to 1%). CRP $16.65 \pm$

18.81 mg/dl (0.95 to 60.2 mg/dl, number of patients 43); SGPT 72.04 ± 49.56 Unit/L (22 to 181, number of patients 25); Serum Ferritin 659.9 ± 488.9 ng/ml (169 to 1550, number of patients 26); Prothrombin Time 14.35 ± 0.95 seconds (13.6 to 15.7 seconds, number of patients 10); D-Dimer 0.25 ± 0.28 μgm/ml (0.025 – 0.68 μgm/ml, number of patients 12), Serum Creatinine 1.08 ± 0.17 mg/dl (0.89 to 1.3 mg/dl, number of patients 12).

Subgroup analysis of the routine laboratory hematological findings based on patients gender variations was as follows: Hemoglobin level was deceased among 71.42% male and 36.36% female; ESR was increased among 80% of male and 72.73% of female patients; Leucocytosis was found in 17.14% male and 18.2% female; Neutrophilic leucocytosis was detected in 17.14% male and 18.2% female; Lymphocytopenia was found among 31.43% male and 18.18% female; Reduce RBC level was noted in 27.27% female this was normal in all male patients (Figure 3 D).

Subgroup analysis of biochemical evaluation depending on gender: CRP and Prothrombin time (PT) was increased in all the male and female patients; increased SGPT level was found among 52.94% male and 25% female; increased serum ferritin level was seen among 68.75% male and 37.5% female; 18.8% male and 100% of female (1 of 1 female patient) had an increased level of serum D-Dimer (Figure 3 F).

Table: 4. Analysis of the hematological findings. The total number of patients n=50.

Parameters	Number of Patients	Mean±SD	Range	Reference value
Male (n)	37			
Female (n)	13			
Age (In years)	50	42.8 ± 8.268	31- 59	
Hemoglobin (gm/dL)	46	13.42 ± 1.324	11.5 – 16.3	F: 12-16; M: 14-18
ESR (mm in 1st hour)	46	29.52 ± 18.46	4 – 46	F: 0-15; M: 0-10
WBC	46	6851 ± 2721	4300 – 16000	4000 – 11000
RBC (Million/CC)	46	4.94 ± 0.65	3.75 – 5.94	4.2 – 6.2
Platelet	46	$229,804 \pm 68,932$	160,000- 421,000	150,000 – 450,000
Neutrophil (%)	46	65.43 ± 12.11	48 – 75	40 - 75%
Lymphocyte (%)	46	28.72 ± 11.97	20 – 45	20 – 45%
Monocyte (%)	46	3.89 ± 2.42	2 – 10	02 – 10%
Esinophil (%)	46	1.96 ± 1.26	0 – 5	01 – 06%
Basophil (%)	46	0.065 ± 0.24	0 – 1	0-1%
CRP (mg/dl)	43	16.65 ± 18.81	0.95 – 60.2	<3
SGPT (Unit/L)	25	72.04 ± 49.56	22 – 181	Male: 16-63 FM: 14-59
Serum Ferritin (ng/ml)	26	659.9 ± 488.9	169 – 1550	Male: 13-370 FM: 9-253
Prothombin Time (Seconds)	10	14.35 ± 0.95	13.6 – 15.7	13
D-Dimer (μgm/ml)	12	0.25 ± 0.28	0.025 – 0.68	<0.5
Serum Creatinine (mg/dl)	12	1.08 ± 0.17	0.89 – 1.3	Male: 0.7-1.3 FM: 0.5-1.2

Difference between the decrease hemoglobin level (P=0.0243) and increased SGPT (P=0.0108) against male and female patients in the Chi-square test and t-test were found significant (Figure 3 G).

Discussion

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) causing COVID-19 has rapidly evolved as an epidemic outbreak. COVID-19 is a systemic infection causing a significant impact on the hematopoietic system and hemostasis mechanism [3]. The incubation period of this virus can be up to 14 days following exposure. According to the center for disease control and prevention (CDC), the individuals with COVID-19 have had a wide range of symptoms reported ranging from mild to severe illness. Symptoms may appear from the second day till the incubation period. These symptoms may include but are not limited to cough, fever, chills, muscle pain, the heaviness of chest, shortness of breath or difficulty breathing, sore throat, and loss of taste or smell. Warning signs of COVID-19 include breathing difficulty, persistent pain or pressure in the chest, inability to wake or stay awake, signs of central cyanoses like bluish lips or face, and confusion [4]. Multiple studies have reported presenting symptoms of COVID-19 worldwide, among which several symptoms are common. But due to geographical locations, these symptoms may differ. In this multicenter study, we analyzed COVID-19 cases among the Bangladeshi population to assess the difference in symptomatic and hematological presentations. Our study revealed that the primary presenting symptoms of COVID-19 patients in Bangladesh included: fever, cough, chest tightness, weakness, anorexia, myalgia, diarrhea, nausea, sleep disturbance, headache, sore throat, respiratory distress, rhinorrhea, abdominal pain, rash or skin lesion, vomiting, vertigo, and restlessness. Among these symptoms, fever and cough were present in the maximum number of cases affected by SARS-CoV-2; followed by chest tightness and weakness; vomiting and vertigo were relatively uncommon (Figure 2 A, B). This study can help healthcare professionals in Bangladesh and others to narrow down the suspected COVID-19 affected cases and differentiate accordingly. In Bangladesh, unlike developed countries, real-time reverse transcription-polymerase chain reaction (RT-PCR) is the only available test which is recommended by the Institute of Epidemiology, Disease Control and Research (IEDCR) for the healthcare settings. The real-time RT-PCR is of the high value of interest for the detection of COVID-19 disease due to its simplicity and specificity [5-7]. But unfortunately RT-PCR test has the risk of eliciting false-negative and false-positive results, as the sensitivity and specificity of the RT-PCR test are not 100% [8]. However, a chest computed tomography (CT) was reported 98% and 97% sensitive in two different studies [9,10]. One of the early studies regarding clinical characteristics of COVID-19 done on 1099 patients in China revealed that the most common symptoms were fever, cough, and fatigue which resembles findings of our study (68.8%, 57.3%, and 41.9%) (Figure 2 A, B). A study on the systematic review focusing on upper airway symptoms revealed that the common symptoms of COVID-19 were fever, cough, and fatigue [11]. These studies with our study confirm that fever and cough are the two most common onset symptoms of COVID-19, including in Bangladesh. Diarrhea, on the other hand, was uncommon (3.8%) [12]; which is common in COVID-19 cases analyzed in our study, 30.6%. Symptoms like Hemoptysis (0.9% Vs 0%) and breathing difficulty (18.7% vs. 19.1%) showed similarity with our findings [12]. But sore throat 13.9% vs 19.7%; headache 13.6% vs 23.4%; nausea and vomiting 5% vs 29% and 9.1%; Myalgia 14.9% vs 35% and skin rash 0.2% vs 14.7% has revealed a very different trends of presenting symptoms then the other reported studies [12]. Our findings of Diarrhea (30.6%) are similar to Song *et al.* This study reported SARS-CoV-2 induced diarrhea could be the onset symptom in patients with COVID-19 [13]. Up to 30% of patients with the Middle East respiratory syndrome (MERS) and 10.6% of patients with SARS had diarrhea as the onset symptom [14]. Bao et al. revealed that vomiting is also associated as the onset symptom in some cases of COVID-19 [15], which was also present among 9.1% of the COVID-19 cases in our study. A similar result was also found in the case of rash/skin lesion, this resembles a case study where rash all over the body was the presenting symptom in a young COVID-19 patient [16]. 16.6% of the patients in our study complained of a mild to moderate degree of abdominal cramp or pain. A case study reported earlier stated that the acute abdomen can be the early symptom in some COVID-19 cases [17]. During the data collection, we have noticed 2 severe cases of COVID-19 with hemoptysis. All the severe cases had per existing comorbid conditions so they were not included in his study. We had observed three cases presented only with anorexia and two cases of severe myalgia later were diagnosed as SARS-CoV-2 infection. As an additional finding, restlessness was complained by 85 (25.63%) of patients, this was

34.76% of symptomatic males and 25.51% of the symptomatic females (Table 2). Based on our findings symptoms like abdominal cramp or pain, myalgia, localize skin lesion or rash, sleep disturbance, and restlessness are important presenting symptoms of COVID-19 disease for this region besides other established symptoms.

According to our study males have a higher infection rate than females 208 (65%) and 112 (35%) in Bangladesh (Figure 1 A). Also only 18.12% of patients were asymptomatic whereas symptomatic cases were 81.88% (Figure 2 C). This is due to lack of test availability and also tests were made available only to the definite symptomatic patients or those who have radiological or laboratory findings suggestive of SARS-CoV-2 infection. The duration of symptoms had no variation depending on gender and age (Figure 1 C, Figure 2 F). Male patient's "home isolation and treatment" numbers are higher than the female patients (Figure 1 D). Age group 31 to 40 years are the most affected n= 127/320 and 10 to 20 are the least n=30/320 (Figure 1 E). Number of cases with or without fever were different 68.75% and 31.25% compare to Wei-Jie Guan *et al* [11]. Duration of fever as had no significant differences regarding presenting temperature in the subgroup analysis (Figure 1 F). High temperature (>100°F) was presented by a relatively larger number of patients than <100°F, 47.5%, and 21.25% of total patients respectively. This was 152 (69.09%) and 68 (30.90%) of patients with fever and does not correlate with the other study [11] (Table 1). Male patients were more affected with cough than female and dry cough was more common than sputum (Figure 2 E). Fever, weakness, anorexia, myalgia, nausea, headache, breathing difficulty, vomiting, and restlessness were more prominent in the case of male than female patients (Table 2, Figure 3 A, B). Chest tightness, sore throat, skin lesion/rash, and vertigo had a higher appearance among female patients (Table 2, Figure 3 A, B). Other than that diarrhea, sleep disturbance and rhinorrhea/nasal congestion have an almost similar presentation in both sexes.

SARS-CoV-2 is a systemic infection with a significant impact on the hematopoietic system and hemostasis. A critical review by Terpos et al. described "COVID-19 disease" as prominent manifestation from the hematopoietic system which is associated with a major blood hypercoagulability. The study indicated that Lymphocytopenia might be considered as a cardinal finding with prognostic potential. On the other hand, Neutrophil/lymphocyte ratio and peak platelet/lymphocyte ratio may also have prognostic

value in determining severe cases. Furthermore, blood hypercoagulability is common among hospitalized COVID-19 patients. Elevated D-dimer levels were consistently reported as well. Thus, the study concluded that in patients with COVID-19 either hospitalized or not, they are at high risk for venous thromboembolism, and an early and prolonged pharmacological thromboprophylaxis with LMWH is highly recommended [18].

To further evaluate the laboratory values in the COVID-19 disease, we analyzed the on-admission laboratory values of 50 hospitalized patients (following exclusion) with a moderate to severe degree of illness. Our study revealed an increased level of ESR, CRP, SGPT, Serum Ferritin, Prothrombin time, and D-Dimer. However, the level of Hemoglobin and RBC were found decreased, this was associated with leukocytosis, neutrophilia, and lymphocytopenia (Figure 2 C, D). The differential expression of WBC analysis revealed normal mean Neutrophil, Lymphocyte, Monocyte, and Eosinophil count (Figure 3 F). Differences between males and females in a few biochemical parameters were seen. Increased levels of SGPT and S. Ferritin were found among males compare to males, and increased levels of D-Dimer were found among females (One in one patient) (Figure 3 E). There were no differences in CRP and prothrombin time levels among male and female COVID-19 patients (Figure 3 E). Hemoglobin count was decreased in the case of males (71.42%) than females (36.36%), though RBC count was normal in all the males and decreased among 27.27% of female patients (Figure 3 D). Difference between the decrease hemoglobin count and increased SGPT against male and female patients was found significant (Figure 3 G). All these suggest us to provide more attention towards gender in the cease of laboratory findings for COVID-19 diagnosis and prognosis. Differences in the gender were noted in the fecal/perianal swab nucleic acid of SARS-CoV-2, wherein male patients werea higher ratio than that of the female [19].

One of our important observations was a delay in diagnosis and therefore treatment from the time of appearance of symptoms, 5.67± 3.56 days (Figure 1 C). This is probably explained by delay in publishing test results, (2 to 3 days from sample collection) unwilling to take tests by patients due to testing and social hazards, and strict indications followed for the PCR test (Fever, breathing difficulty, chest discomfort, Chest X-ray findings, and associated hematological findings) by the COVID-19 tertiary center doctors due to limited resources.

Conclusions

According to this study, COVID-19 patients in Bangladesh though has similarity with the presenting symptoms like fever, cough, and berating complaints, but symptoms like myalgia, diarrhea, skin rash, headache, Abdominal pain/cramp, nausea, vomiting, restlessness, and a higher temperature of >100°F had a greater presentation rate and more frequent even as an isolated presentation of SARS-CoV-2 infection than other published studies. Also, a significant difference between the decreased hemoglobin count (higher in the male) and increased SGPT (higher in female) against gender establish these two markers with diagnostic and prognostic value. Hematological findings like CRP and Prothrombin time were found to increase among all of our study patients. Besides, an increase in Serum ferritin, ESR, SGPT, and D-Dimer along with erythrocytopenia and lymphocytopenia can be important supportive diagnostic criteria. Due to differences in presentations and difficulty in testing, some common symptoms create confusion regarding diagnosis and mislead a SARS-CoV-2 infection like a common viral flu. This might cause morbidity and mortality to COVID-19 patients. Moreover, a chest CT is neither affordable for most of the patients nor available in rural healthcare settings in Bangladesh. So, there is a possibility of patients affected by SARS-CoV-2 may remain undiagnosed due to a false negative real-time RT-PCR test or not being sensitive to the real-time RT-PCR test. Thus, if further tests can't be done to confirm the diagnosis such as a chest CT in patients having these common symptoms and hematological manifestations should be treated as COVID-19 patients to narrow the spread of the COVID19 and stop the symptomatic patients from developing severe illness any further. Our study has limitations, namely the small sample size and selection of cases that may affect the study outcome. But we believe the above findings will help to guide physicians and researchers to have a different view and better management of COVID-19 disease during this crisis period.

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