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Alam MS<sup>1</sup>, Hasan ABMK<sup>2</sup>, Kalam ST<sup>3</sup>, Jahid ABMM<sup>4</sup>, Islam N<sup>5</sup>

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# Editorial

## COVID-19 Pathophysiology: Body system and Organs affected

Islam N

First case of COVID-19 was detected in Wuhan, China, in December 2019. Subsequently it created worldwide health crisis & caused huge morbidity & casualties across the globe.

COVID-19 is a new disease entity and it is pathophysiologically distinct from non-COVID-19 related acute respiratory distress syndrome (ARDS) and other coronavirus infections. Presentations of COVID-19 infection range from asymptomatic to mild or moderate respiratory and non-respiratory symptoms, to severe pneumonia and ARDS with multiorgan failure. Hypoxaemia is the leading feature of COVID-19 pneumonia which can progress to ARDS. COVID-19 pneumonia is characterized by respiratory rate >30 breaths per minute or oxygen saturation (SpO<sub>2</sub>) <93% including 2 fever and cough. About 15% cases progress to severe stage requiring oxygen support and 5% develop ARDS, septic shock and multiorgan failure.<sup>1</sup>

The pathogenesis of COVID-19 pneumonia can be explained by two phases. The early phase, characterized by the invasion of virus into the epithelium of respiratory tract and can cause direct tissue damage. In late phase, the infected host cells trigger immune response with recruitment of T-lymphocytes, monocytes and neutrophil and after that release of cytokine such as TNF  $\alpha$ , IL-6, IL-8, IL-12 and interferon- $\gamma$  and elevated concentrations of inflammatory markers, including D-dimer, ferritin and C-reactive protein (CRP).<sup>2</sup> Release of high level of cytokines into the circulation resulting from over activation of the immune system is known as cytokine storm. The effect of cytokine storm includes a) Endothelitis leading to microthrombi formation b) Dysregulation of renin angiotensin aldosterone system (RAAS) c) Activation of the kallikrein-bradykinin pathway d) Swelling of the epithelial cells due to enhanced contraction. The consequence of these is the development of pulmonary edema which can progress to ARDS.<sup>3</sup>

The principal target for COVID-19 is the respiratory system but other major system such as cardiovascular system, GIT, hepatobiliary system, renal system, central nervous system and haematological system can also be affected. COVID-19 viruses are directly cytotoxic to ACE2 receptors mediated cells. Involvement of myocardial cells which is also ACE2 receptor mediated, result in myocarditis and cardiac arrhythmia. Another cardiac manifestation of COVID-19 is acute coronary syndrome and is likely due to hypercoagulability, release of cytokines, stress cardiomyopathy and haemodynamic abnormality.<sup>4</sup>

Most common haematological abnormality due to COVID-19 virus is leucopenia. Different hypotheses have been encountered regarding leucopenia that include direct invasion of the virus into the lymphocyte and the lymphoid organs. Another haematological effect is thrombocytopenia and factors include suppression of platelet production, autoantibody formation and activation of coagulation cascade resulting platelet consumption. Neutrophilia associated with thrombocytopenia is the hallmark of severe COVID-19 disease, although the exact mechanism of these conditions is unknown.<sup>5</sup>

The ACE2 receptors are also present in the human brain, that's why COVID-19 can invade the central nervous system through the olfactory nerve and vascular endothelial cells. Effect of the COVID-19 in GIT and hepatobiliary system is multifactorial and may be due to direct invasion into the gut mucosa and hepatocytes that causes cytokine mediated inflammation and vascular abnormality.<sup>6</sup>

The pathogenesis of kidney injury by COVID-19 virus is also multi-factorial such as direct cytotoxic injury, imbalance in the RAAS system, microvascular injury, cytokine induced hyperinflammation and pro-thrombotic state.<sup>7</sup>

The mechanism of organ dysfunction by the COVID-19 virus is combinations of direct viral invasion, cytokine mediated injury, microthrombosis, ischemic vascular injury, hyper activation of the immune system and dysregulation of the RAAS. But these all are proposed mechanism and the exact pathogenesis of organ involvement is still unknown.

More than 65 million people had died due to the COVID-19 virus infection worldwide. The current management provides only supporting care to reduce the mortality rate. It is essential to identify the exact pathophysiology of multiple organ dysfunction due to COVID-19 infection, which will help the clinician for proper management of COVID-19 patients.

### **Reference**

1. Wei P-F. Diagnosis and treatment protocol for novel coronavirus pneumonia (trial version 7). *Chin Med J (Engl)* 2020; 133: 1087–95.
2. Azkur AK, Akdis M, Azkur D, et al. Immune response to SARS-CoV-2 and mechanisms of immunopathological changes in COVID-19. *Allergy*. 2020 Jul;75(7):1564-1581.
3. Ackermann M, Verleden SE, Kuehnel M, et al. Pulmonary Vascular Endothelialitis, Thrombosis, and Angiogenesis in Covid-19. *N Engl J Med*. 2020 Jul 09;383(2):120-8.
4. Liu H, Wei P, Zhang Q, et al. 501Y.V2 and 501Y.V3 variants of SARS-CoV-2 lose binding to Bamlanivimab in vitro. *bioRxiv*. 2021 Feb 16.
5. Amgalan A, Othman M. Exploring possible mechanisms for COVID-19 induced thrombocytopenia: Unanswered questions. *J Thromb Haemost*. 2020 Jun;18(6):1514-1516.
6. Patel KP, Patel PA, Vunnam RR, et al. Gastrointestinal, hepatobiliary, and pancreatic manifestations of COVID-19. *J Clin Virol*. 2020;128: 104386.
7. Gabarre P, Dumas G, Dupont T, Darmon M, Azoulay E, Zafrani L. Acute kidney injury in critically ill patients with COVID-19. *Intensive Care Med*. 2020 Jul;46(7):1339-48.

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## Profile of COVID-19 Patients Admitted in Isolation Centers of Combined Military Hospital Dhaka

Hamid MA<sup>1</sup>

### Abstract

**Introduction:** Coronavirus Disease 2019 (COVID-19) is expanding worldwide. The characteristics of COVID-19 patients vary from country to country. To move forward, clinical data on infected patients are needed. Here, the study is done to look for the diverse profiles of COVID-19 patients, based on socio-demographic and clinical characteristics.

**Objectives:** To explore the comprehensive diverse profiles of selected COVID-19 patients admitted in isolation centers of

Combined Military Hospital Dhaka. **Methods and Materials:** This is a descriptive qualitative study, the sample of which has been taken purposively from the medical records of RT-PCR positive 200 COVID-19 patients at Combined Military Hospital, Dhaka. The study was conducted from 01 July 2020 to 30 June 2021. **Results:** The mean age of the selected 200 COVID-19 patients was 45.98 ( $\pm 14.35$ ) years and most (63, 31.5%) of the patients were from age group of 35-50 years. Majority (147, 73.5%) of them were male patients and from non-health workers (176, 88.0%). Almost 192(96%) patients were symptomatic and only 16(8%) patients had history of contact. Among them, 114(57%) patients did not have lungs involvement and 98(49.0%) patients did not need oxygen at all. Only 47(23.5%) & 05(2.5%) patients had been placed under severe & critical condition respectively. Out of 200 COVID-19 patients, 48(24%) & 87(43.5%) patients had D-dimer and CRP positive respectively and only 97(48.5%) patients had underlying co-morbidities. Only 64(32.0%) COVID-19 patients had raised ferritin level, 98(49%) COVID-19 patients needed anticoagulant and only 107(53.5%) patients had been treated with antiviral drugs. Majority of the patients (119, 59.5%) stayed for 10-20 days in hospital under admission. Lungs involvement of COVID-19 patients had significant association with anticoagulant therapy ( $p=.000$ ), serum creatinine level ( $p=.002$ ), CRP level ( $p=.000$ ) and ferritin level ( $p=.000$ ). There was no statistically significant association ( $p=0.053$ ) between co-morbidities and disease outcome. There was a very weak negative relationship between age of the selected COVID-19 patients & the total hospital stays and it was not statistically significant correlation,  $p=.080$  ( $P>0.05$ ). **Conclusion:** Distinct socio-demographic presentation with age variability, clinical presentation with variable fatality in different countries may help in taking the further steps by the policymaker of low resource countries for the prevention of infection and management of COVID-19. In this study, emphasis has been given on early diagnosis, early isolation and early management of all COVID-19 patients to reduce transmission and mortality, thus, to save mankind from this invisible enemy.

**Keywords:** COVID-19, RT-PCR

### Introduction

Corona is a highly disseminating viral disease imparted by severe acute respiratory syndrome. Round or elliptical shaped Severe Acute Respiratory Syndrome Coronavirus2 (SARS-COV-2) is a positive-stranded RNA virus belonging to beta-CoV genus of family Coronaviridae. The outbreak of COVID-19, a deadly

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respiratory disease caused by a newly emerged coronavirus was first detected in the Wuhan province of China on 31 December 2019. In Bangladesh, the first known case was reported on March 7, 2020 by IEDCR.<sup>1-2</sup> Within a few days, several patients from Wuhan, China were admitted to hospitals showing some common symptoms of pneumonia. Now, it has been spread around

the whole world with its pandemic notion. As a consequence of rapid transmission, World Health Organization declared an immediate public health emergency of international concern (PHEIC) alarm on January 30, 2020. Coronavirus is not newly appeared indeed, rather in 2003, the severe acute respiratory syndrome (SARS) outbreak appeared in another state Guangdong of China. Later on, in September 2012, MERS-CoV (Middle East Respiratory Syndrome Coronavirus) associated with deaths were reported in 858 cases. The World Health Organization (WHO) declared the COVID-19 pandemic a global public health emergency of international concern in 11 March 2020. The disease, novel coronavirus (2019-nCoV) transmission occurred due to SARS-CoV-2. Severe Acute Respiratory Syndrome Coronavirus-2 infection was termed by World Health Organization as Coronavirus Disease, COVID-19.<sup>3</sup> Since December 2019, the world is experiencing COVID-19 situation and no way the Bengali people are escaped from this. As this is a novel coronavirus, still evolving, we are learning new information's every day. The socio-demographic profile, sources of infection, clinical presentation, co-morbidities and disease outcomes of COVID-19 patients are different from case to case and vary significantly both nationally and globally. Based on the epidemiological investigations, the virus has been found to be infectious in asymptomatic patients.<sup>4</sup> Human-to-human transmission of SARS-CoV-2 has been widely shown in health care, community and family settings. Primarily it spreads from person to person by close contact through small droplets of saliva or discharge from the nose, when an infected person coughs, sneezes or exhales. Every age group is prone to suffer from the novel coronavirus. But according to data received from studies conducted throughout the world, frequently affected individuals belong to middle and older age groups with an age range of 65-85 years.<sup>5</sup> Laboratory findings detected in the majority of COVID-19 disease sufferers are lymphocytopenia (82.3%), thrombocytopenia (36.2%), leukopenia (33.7%), majority of patients reported high levels of C-Reactive Protein (CRP), less frequent were high levels of alanine transaminase (ALT), aspartate aminotransferase (AST), creatinine kinase (CK) and D-dimer. Computed tomography scans (CT-Scan) in a majority of patients are suggestive of ground-glass opacity (65%), ill-defined margins (81%), smooth or

irregular interlobular septal thickening (35%), air bronchogram (47%), crazy paving pattern (10%) and thickening of neighboring pleura (32%). Nucleic acid detection by reverse transcription quantitative polymerase chain reaction (RT-PCR) is the prime diagnostic modality for coronavirus disease 2019.<sup>6</sup> The whole world is fighting against this invisible enemy and has become a global public health concern. This coronavirus 2 outbreaks are associated with high morbidity and mortality rates globally. Over the past year, the coronavirus disease pandemic has escalated and continues to threaten the health and wellbeing of the population. The virus has already transmitted to more than 75 million people from over 213 countries and territories, with nearly 1.6 million deaths as of 20 December 2020, indicating an overall death rate of diagnosed cases as 2.27%.<sup>7</sup> Recent studies have also indicated that clinical spectrum of COVID-19 may vary across diverse ethnic backgrounds and geographic locations worldwide.<sup>8</sup> Due to distinct demographics of infection, variation of case fatality and clinical presentation in different countries, the knowledge of demographic distribution and analysis of the clinical profile from this study would help for patient management of COVID-19 till the invention of specific drug and vaccines. Scientific research is going on throughout the world to know more about this virus, so that we can combat against it.<sup>9</sup> Recent studies have shown that a variety of risk factors are associated with the prognosis of COVID-19. Patients with cardiovascular diseases, diabetes, and other co-morbidities are often subject to acute respiratory distress syndrome, shock, multi-organ failure, cytokine storm, and other serious complications in COVID-19. These patients commonly have a poor prognosis. Recent studies from different cohorts of patients have also identified other several factors, including viral load, lymphocytes percentage, C-Reactive Protein (CRP), Interleukin-6 (IL-6), Procalcitonin (PCT), and Lactic Acid (LA) as warning indicators of prognosis in COVID-19 patients.<sup>10</sup>

#### Methods and Materials

This was a descriptive qualitative study has been conducted at Combined Military Hospital Dhaka to ascertain the diverse patient's profiles of those suffered from COVID-19 and admitted in isolation centers at Combined Military Hospital, Dhaka. The time span of

the study was one year (01 July 2020 to 30 June 2021). All RT-PCR positive COVID-19 both serving and retired patients admitted at Combined Military Hospital Dhaka were considered the study population. All RT-PCR negative non-COVID patients and all COVID-19 patients leaving CMH as 'discharge on request bond' (DORB) were excluded from the study. Considering the available resources, two hundred (200) samples were taken to execute the study. Non-probability sampling of purposive type has been followed. Check list was used as the data collection technique. After getting approval of the research proposal, formal permission had obtained from the authority of Combined Military Hospital (CMH) Dhaka. Data has been thoroughly edited by checking and rechecking for quality control. Coding, editing, cleaning and categorization have been done as required. Emphasis has been given to qualitative analysis. Some descriptive statistics has been done too. These has been presented illustratively and narrated textually. Data analysis has been done by laptop with the help of "Statistical Package for Social Science" (SPSS-26). Both etic and emic interpretation has been done by taking care of specific objectives and answer to the research question. Formal approval of the study has been obtained from the protocol approval board of Armed Forces Medical Institute, followed by ethical clearance from authorized committee. Permission for data collection has been taken from the Commandant, Combined Military Hospital (CMH) Dhaka. Privacy and confidentiality of data has been strictly maintained. Ethical clearance has been taken from standing ethical approval board of Directorate General of Medical Service (DGMS).

## Results

**Table I:** Distribution of age groups among selected COVID-19 patients (n=200)

	Age Groups	Frequency (n)	Percentage (%)
COVID-19 patients	20-35 years	57	28.5
	35-50 years	63	31.5
	50-65 years	56	28.0
	65-80 years	8	4.0
	80 years and above	16	8.0

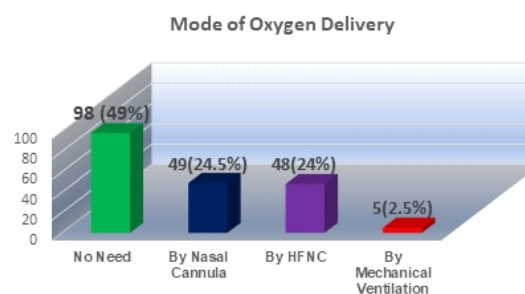
Mean  $\pm$  SD= 45.98  $\pm$  14.35, Range= 21-85 years

**Table II:** Distribution of contact history of COVID-19 patients (n=200)

COVID-19 patients	Yes n(%)	No n(%)
Symptomatic	192(96)	8(4.0)
History of contact	16(8.0)	184(92.0)
Lungs involvement by HRCT	86(43)	114(57)
Anticoagulant therapy	98(49.0)	102(51.0)
Smoking habit	21(10.5)	179(89.5)
Presence of comorbidities	97(48.5)	103(51.5)

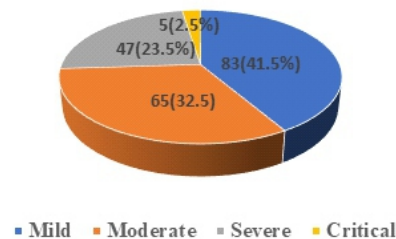
**Table III:** Distribution of sex and occupation among COVID-19 patients (n=200)

COVID-19 patients	Sex		Occupation	
	Male	Female	Total	Health Worker Non-Health Worker
	147(73.5%)	53(26.5%)	200(24%)	(12%) 176(88%)



**Figure I:** Distribution of mode of O<sub>2</sub> delivery among 200 COVID-19 patients

**Grading of COVID-19 Disease Severity**



**Figure II:** Distribution of grading of COVID-19 disease

**Table IV:** Distribution of D. Dimer level among selected

COVID-19 patients	Positive n(%)	Negative n(%)
D. Dimer	48(24.0%)	152(76.0%)
CRP	87(43.5%)	113(56.0%)



**Table V:** Distribution of S. Creatinine level among COVID-19 patients (n=200)

COVID-19 patients	S. Creatinine n(%)	Ferritin n(%)
Normal	40(20.0%)	136(68.0%)
Raised	160(80.0%)	64(32.0%)
Total	200	200

**Table VI:** Distribution of antiviral treatment among selected COVID-19 patients (n=200)

	Antiviral	Frequency n(%)	Percentage n(%)
COVID-19 Patients	Favipiravir	35	17.5
	Remdesivir	37	18.5
	Favipiravir & Remdesivir	35	17.5
	Not given	93	46.5
	Total	200	100.0

**Figure III:** Distribution of hospital stay of COVID-19 patients (n=200).**Table VII:** Distribution of disease outcome among COVID-19 patients (n=200)

	Disease outcome	Frequency (n)	Percentage (%)
COVID-19 patients	Cure & Discharge	190	95.0
	Death & Discharge	10	5.0
	Total	200	100.0

**Table VIII:** Association between lungs involvement and anticoagulant therapy of COVID-19 patients (n=200)

Lung's involvement Diagnosed by HRCT	COVID-19 patients		Total	Significance $\chi^2=35.521$ df=
	Anticoagulant therapy Yes	No		
	Yes	63(73.26%)	23(26.74%)	86(100%)
No	35(30.70%)	79(69.30%)	114(100%)	
Total	98(49.00%)	102(51.00%)	200(100%)	

**Table IX:** Association between lungs involvement and S.Creatinine level of COVID-19 patients (n=200)

Lungs Involvement by HRCT	COVID-19 patients			Significance $\chi^2=9.874$ df=
	S. Creatinine Normal	Raised	Total	
	Yes	26(30.23%)	60(69.77%)	86(100%)
No	14(12.28%)	100(87.72%)	114(100%)	
Total	40(20.00%)	160(80.00%)	200(100%)	

**Table X:** Association between lungs involvement & CRP level among COVID-19 patients (n=200)

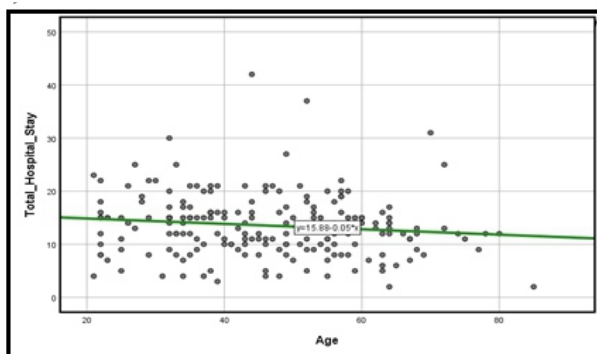
Lungs Involvement by HRCT	COVID-19 patients			Significance $\chi^2=15.329$ df=
	CRP Negative	Positive	Total	
	Yes	35 (40.70%)	51(59.30%)	86(100%)
No	78(68.42%)	36(31.58%)	114(100%)	
Total	113(56.50%)	87(43.50%)	200(100%)	

**Table XI:** Association between Lungs involvement & Ferritin level of COVID-19 patients (n=200)

Lungs Involvement by HRCT	COVID-19 patients		Total	Significance $\chi^2=17.035$ df=
	Normal	Ferritin Raised		
	Yes	45(52.33%)	41(47.67%)	86(100%)
No	91(79.83%)	23(20.17%)	114(100%)	
Total	36(68.00%)	64(32.00%)	200(100%)	

**Table XII:** Association between co-morbidities & disease outcome among COVID-19 patients (n=200)

Presence of co-morbidities	COVID-19 patients			Significance $\chi^2=4.182$ df=1
	Cure & Discharge	Death & Discharge	Total	
	Yes	89(91.75%)	8(8.25%)	97(100%)
No	101(98.06%)	2(1.94%)	103(100%)	
Total	190(95%)	10(5%)	200(100%)	



**Figure IV:** Correlation and regression analysis between different age groups of the COVID-19 patients stays

### Discussion

This was a cross sectional qualitative study designed and conducted into isolation centers of Combined Military Hospital (CMH) Dhaka regarding profiles of selected COVID-19 patients from the medical record. A total of two hundred COVID-19 patients case history were selected purposively. The age groups of the 200 selected COVID-19 patients showed that 63(31.5%), 57(28.5%) and 56(28.0%) patients were in the age groups of 35-50 years, 20-35 years & 50-65 years respectively. The remaining 08(04.0%) and 16(08.0%) COVID-19 patients were in the age groups of 65-80 years and 80 years & above respectively. The mean age of the selected 200 COVID-19 patients was 45.98( $\pm$ 14.35) years. The findings were similar to that of Mowla et al.<sup>11</sup> By the sex groups of COVID-19 patients showed that majority i.e., 147(73.5%) were male patients. The remaining 53(26.5%) were female patients. These findings were similar to another study done by Ahmed et al.<sup>4</sup> and Mamun et al.<sup>12</sup> The study revealed the distribution of COVID-19 patients by their occupation. It was evident that among 200 COVID-19 patients, 176(88.0%) belonged to NHW (Non-Health Worker) & rest 24(12.0%) were in the group of HW (Health Worker). By the clinical presentation, it was showed that symptomatic distribution of COVID-19 patients were 192(96.0%), the remaining 08(4.0%) COVID-19 patients were asymptomatic patients. These findings were similar to another study done by Mowla et al.<sup>11</sup> and Jami et al.<sup>13</sup> The study revealed that 184(92.0%) COVID-19 patients did not have any history of contact with COVID-19 patients and the remaining 16(8.0%) patients had history of contact with COVID-19 patients. These findings were similar to that of Hasan et al.<sup>8</sup> and Hossain et al.<sup>14</sup> This study revealed that majority of the COVID-19 patients

i.e., 179(89.5%) were non-smokers & remaining 21(10.5%) patients were smokers. These findings were similar to that of Altonen et al.<sup>15</sup> The study revealed that majority i.e., 114(57.0%) COVID-19 patients did not have lungs involvement. Only 86(43.0%) COVID-19 patients had lungs involvement among 200 selected patients. These findings were similar to that of Jami et al.<sup>13</sup> and Ng et al.<sup>16</sup> By the mode of O<sub>2</sub> delivery among 200 COVID-19 patients, most of the selected COVID-19 patients i.e., 98(49.0%) COVID-19 patients did not need oxygen at all whereas 49(24.5%) COVID-19 patients need oxygen delivery by Nasal Cannula and 48(24.0%) COVID-19 patients need oxygen delivery by HFNC (High Flow Nasal Cannula). The remaining 05(2.5%) COVID-19 patients were placed under mechanical ventilation. These findings were similar to another study done by Asghar et al.,<sup>5</sup> and Hasan et al.<sup>8</sup> It was found that 83(41.5%), 65(32.5%), 47(23.5%) & 05(2.5%) COVID-19 patients were placed under the disease severity of mild, moderate, severe & critical grading among 200 COVID-19 patients respectively. These findings were similar to that of Hasan et al.<sup>8</sup> and Hossain et al.<sup>1</sup> The study revealed that among 200 COVID-19 selected patients, majority patients i.e., 152(76.0%) COVID-19 patients were D-dimer negative and only 48(24.0%) COVID-19 patients were D-dimer positive. These findings were similar to another study done by Hasan, et al.<sup>8</sup> The study revealed that majority i.e., 113(56.5%) COVID-19 patients were CRP negative and only 87(43.5%) CRP positive. These findings were similar to another study done by Jami et al.<sup>13</sup> The study revealed that majority i.e., 103(51.5%) patients had no co-morbidities & 97(48.5%) patients had co-morbidities. These findings were similar to that of Paul et al.<sup>1</sup> and Mowla et al.<sup>11</sup> It was found that among 200 COVID-19 selected patients, majority patients i.e., 160(80.0%) COVID-19 patients had raised serum creatinine level and only 40(20.0%) COVID-19 patients had normal serum creatinine level. A total of 136(68.0%) patients had normal ferritin level and only 64(32.0%) patients had raised ferritin level. Again, 102(51.0%) patients did not need anticoagulant for treatment. Only 98(49.0%) COVID-19 patients need anticoagulant for treatment. These findings were similar to another study done by Paul et al.<sup>1</sup> and Mowla et al.<sup>11</sup> In respect of antiviral treatment, 35(17.5%) patients, 37(18.5%) patients & 35(17.5%) patients of COVID-19 were given Favipiravir, Remdesivir and both Favipiravir &

Remdesivir respectively. Only 93(46.5%) patients had not been given any sort of antiviral drugs. These findings were similar to that of Goshayeshi et al.<sup>17</sup> It was found that majority i.e., 119(59.5%) patients stayed for 10-20 days in hospital under admission. Second highest majority i.e., 59(29.5%) patients had been in hospital for 01-10 days. Other patients 19(9.5%), 02(1.0%) and 01(0.5%) had been in hospital for 20-30 days, 30-40 days and 40 days & above respectively. These findings were similar to another study done by Mowla et al.,<sup>11</sup> and Hossain et al.<sup>14</sup> In this study total 190(95%) COVID-19 patients were cured & discharged from the hospital. The remaining 10(5%) COVID-19 patients out of 200 COVID-19 patients died in the hospital. These findings were similar to that of Mowla et al.,<sup>11</sup> and Ahsan et al.<sup>2</sup> The study found that lungs involvement of 63(73.26%) patients diagnosed by HRCT, were treated with anticoagulant & 23(26.74%) patients also diagnosed by HRCT but were not treated with anticoagulant therapy. Only 35(30.70%) patients did not have lungs involvement but treated with anticoagulant therapy, and 79(69.30%) patients neither had lungs involvement nor had requirement of anticoagulant therapy. These differences were statistically significant [ $\chi^2=35.521$ ,  $df=1$ ,  $p=0.000$ ]. The study revealed that COVID-19 patients with lungs involvement had raised serum creatinine in 60(69.77%) patients & 26(30.23%) patients had normal serum creatinine. Again COVID-19 patients did not have lungs involvement, had normal and raised serum creatinine level in 14(12.28%) & 100 (87.7%) patients respectively. Here, these differences were statistically significant [ $\chi^2=9.874$ ,  $P=0.002$ ]. In regards to lungs involvement diagnosed by HRCT, 35(40.70%) & 51(59.3%) COVID-19 patients had negative & positive CRP respectively. On the other hand, among the patients without lungs involvement 78(68.42) & 36(31.58%) were negative & positive CRP level respectively. So, these differences were statistically significant [ $\chi^2=15329$ ,  $p=0.000$ ]. Patients with lungs involvement, 45(52.33%) & 41(47.67%) had normal & raised ferritin level respectively. Whereas, patients without lungs involvement, 91(79.83%) & 23(20.17%) had normal & raised ferritin level respectively. Hence these differences were statistically significant [ $\chi^2=17.035$ ,  $p=0.000$ ]. In respect of COVID-19 disease outcome with presence of co-morbidities, 89(91.75%) patients & 08(8.25%) patients were discharged with cure & discharged with

death from the study hospital respectively. On the other hand, disease outcome without co-morbidities among selected 200 COVID-19 patients, 101(98.06%) patients and 02(1.94%) patients were found discharged with cure & discharged with death respectively. These differences were not statistically significant [ $\chi^2=4.182$ ,  $p=0.053$ ]. The study found the correlation coefficient equal to 0.124 which indicating a very weak negative relationship between age of the selected COVID-19 patients & the total hospital stays and it was not statistically significant correlation,  $p=0.080$  ( $p>0.05$ ).  $AsR^2=0.015$ , i.e., 1.5% variation ( $0.015 \times 100=1.5\%$ ) of hospital stay can be explained by age of the patients. That is hospital stay is dependent on age by 1.5 percent.

### Conclusion

A single centered study of hospitalized patients in a developing country with confirmed COVID-19 showed a number of factors linked with disease severity and mortality. The clinical profile and characteristics of patients along with the levels of several biomarkers can be a predictor of disease severity and mortality, although multiple large center prospective surveys must undergo in order to explore the findings demonstrated. Acute Respiratory Distress Syndrome (ARDS) was a relatively lesser-known finding in our population, on the other hand, acute liver and kidney injuries are more frequent in the sufferers of COVID-19. Our current understanding of COVID-19 is limited and is still evolving. COVID-19 disease burden has put a lot of pressure on health resources and patient care. The characteristics of severe COVID-19 varied substantially between fatal cases and survivors with diabetes and cardiovascular disorders the most prevalent co-morbidities. Distinct demographic presentation with age variability, clinical presentation with variable fatality in different countries may help the further steps taken by the policymaker of low resource country for the prevention of infection and management of COVID-19. We must give emphasis on early diagnosis, early isolation and early management of all COVID-19 patients to reduce transmission and mortality, thus, to save mankind from this invisible enemy.

### Conflicts of interest

There are no conflicts of interest regarding the publication of this paper

## References

1. Paul N, Azad NA, Parveen R, et al. Clinical profile of first 100 cases of COVID-19 in a COVID-dedicated hospital of Bangladesh. *BIRDEM Med J.* 2020;10:18-22.
2. Ahsan, Sultana ASMA, Fatema R, et al. Demographic and clinical profile with early outcome of critically ill COVID-19 patients admitted in an ICU of a tertiary care hospital in Dhaka, Bangladesh. *BIRDEM Med J.* 2020;10:51-5.
3. Alam S, Bhuiyan, Emon FR, Hasan THM. Prospects of nutritional interventions in the care of COVID-19 patient. *Heliyon.* 2021;7(2):e06285.
4. Ahmed N, Islam M, Kabir A, Rahman MA, Sadat MHS. Clinico-Pathological Findings of Bangladeshi Covid 19 Patients with their Clinical Outcome: Study of A Cohort of 201 Cases. *JBCPS.* 2020;38:37-2.
5. Asghar MS, Kazmi SJH, Khan NA, Akram M, Khan SA, Rasheed U. Clinical Profiles, Characteristics, and Outcomes of the First 100 Admitted COVID19 Patients in Pakistan: A Single-Center Retrospective Study in a Tertiary Care Hospital of Karachi. 2020; 12(6): e8712.
6. Yamamotoa K, Suzukia M, Yamadaa G, Sudoa T, Nomotoa H, Kinoshitaa N. Utility of the antigen test for coronavirus disease 2019: Factors influencing the prediction of the possibility of disease transmission. *Int J Infect Dis.* 2021 Mar 01; 104:65-72.
7. Wahaibi AW, Maani AA, Alyaquobi F, Harthy KA, Jardani AA, Rawahi BA. Effects of COVID-19 on mortality: A 5-year population-based study in Oman. *Int J Infect Dis.* 2021 Mar 1; 104:102-107. Available from <https://doi.org/10.1016/j.ijid.2020.12.054>
8. Hasan MZ, Biswas NK, Aziz AM, Chowdhury J, Haider SS, Sarker M. Clinical profile and short-term outcomes of RT-PCR positive COVID-19 patients in a tertiary care hospital in Dhaka, Bangladesh. *BMJ.* 2021;11(12):e055126. [Tabatabaei](https://doi.org/10.1136/bmj.n126)
9. SMH, Talari H, Moghaddas F, Rajebi H. CT Features and Short-term Prognosis of COVID-19 Pneumonia: A Single-Center Study from Kashan, Iran. 2020 Apr 20;2(2):e200130.
10. Kang L, Ji X, Li G, Wang Q, Li Y. Validation of Predictors of Disease Severity and Outcomes in COVID-19 Patients: A Descriptive and Retrospective Study. *Med* 2020;1:128-138.
11. Mowla SG, Azad KA, Kabir A et al. Clinical Profile of 100 Confirmed COVID-19 Patients Admitted in Dhaka Medical College Hospital, Dhaka, Bangladesh. *JBCPS.* 2021;38:29-6.
12. Mamun SA, Noor M, Jahan R, Khan S. Demographic and Clinical profile of COVID-19 Patients in a Tertiary Care Private Hospital of Dhaka, Bangladesh: An Observational Study. *BJM.* May 2021; 32(1):25-0.
13. Jami S, Hao L, Roy B, Zhou Z, Tanvir M, Mobarak S. Diagnostic Value of High-Resolution CT Imaging for COVID-19 in 24 Confirmed Cases. *BJID.* 2021;7:S3-S10.
14. Hossain HT, Chowdhury T, Majumder MI, Ava AR, Rahman QA, Zahiruddin M. Demographic and Clinical profile of 190 COVID-19 Patients in a Tertiary Care Private Hospital of Dhaka, Bangladesh: An Observational Study. *JOM.* 2021;21(2):82-8.
15. Altonen BL, Arreglado TM, Leroux O, Murray-Ramcharan M, Engdahl R. Characteristics, comorbidities and survival analysis of young adults hospitalized with COVID-19 in New York City. *PLoS ONE.* 2021 Dec 14; 15(12):e0243343.
16. MY, Lee EYP, Yang J, Yang F, Li X, Wang H. Imaging Profile of the COVID-19 Infection: Radiologic Findings and Literature Review. *RSNA.* 2020 Feb 13; 2(1):e200034. <https://doi.org/10.1148/ryct.2020200034>.
17. Goshayeshi L, Akbari Rad M, Bergquist R, Allahyari A, Hashemzadeh K. Demographic and clinical characteristics of severe Covid-19 infections: a cross-sectional study from Mashhad University of Medical Sciences, Iran. *BMC Infect Dis.* 2021 Jul 7; 21(1):656. doi: 10.1186/s12879-021-06363-6. PMID: 34233638; PMCID: PMC8261035.

## Otorhinolaryngeal Manifestations of Covid-19 Patients

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### Abstract

**Background:** The novel corona virus disease 2019 (Covid-19) is caused by severe acute respiratory syndrome corona virus 2 in short called SARSCoV- 2. The first case was identified in December 2019, in Wuhan, China. It is an infectious disease and has led to the ongoing global pandemic. This pandemic has also started in Bangladesh, with its first case reported on 26 March, 2020. **Methods:** A prospective study was conducted on 200 laboratory confirmed cases. Proper history was taken and clinical examinations were performed. Consent was taken from the patients included in the study. **Results:** In our study, we found that 170 patients presented with otorhinolaryngological manifestations and 30 patients did not have any otorhinolaryngological manifestations. The most common otorhinolaryngeal symptoms with which the patients presented were sore throat 85% and headache 46%. The other otorhinolaryngeal symptoms were hyposmia 30% and nasal congestion 40%. The most common non-ENT symptoms were fever 94% and cough 85%. The other nonotorhinolaryngeal symptoms with which the patients presented were malaise, generalized body ache and abdominal symptoms like diarrhoea. This prospective study gives a view of the incidence of otorhinolaryngological manifestations in Covid-19 patients. **Conclusion:** Fever and cough are the dominant symptoms of Covid-19, but otorhinolaryngological manifestations of Covid-19 are common and should be a part of the suspected clinical criteria for Covid-19. The most common symptoms are sore throat, nasal congestion and obstruction, headache and lastly olfactory dysfunction. A universal questionnaire via welldefined Covid-19 manifestations is required to make the Covid-19 data accurately defined, homogenous and complete.

**Keywords:** Corona virus, Hyposmia, Dysgeusia, Pandemic, Otorhinolaryngological manifestation

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### Introduction

Corona viruses are a group of RNA viruses that cause diseases in mammals and birds. In humans, these viruses cause respiratory tract infections that can range from mild to severe. Mild illnesses include common cold, which is also caused by other viruses, predominantly rhinoviruses, while more lethal varieties can cause SARS, MERS, and Covid-19. They are enveloped viruses with single-stranded RNA genome and a nucleocapsid of helical symmetry. The genome size of corona viruses ranges from approximately 26 to 32 kilobases, one of the largest among RNA viruses. They have characteristic club-shaped spikes that project from their surface. The corona virus surface spikes are homotrimers of the S protein, which is composed of an

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S1 and S2 sub unit. The homotrimeric S protein is a class I fusion protein which mediates the receptor binding and membrane fusion between the virus and host cell. The S1 subunit forms the head of the spike and has the receptor binding domain (RBD). The S2 sub unit forms the stem which anchors the spike in the viral envelope and on protease activation enables fusion. The E and M protein are important in forming the viral envelope and maintaining its structural shape.<sup>1</sup> Infected carriers are able to shed viruses into the environment. Corona viruses mainly target epithelial cells. They are transmitted from one host to another host, depending on the corona virus species, by either an aerosol or fomite. The incubation

period for Covid-19 since the exposure to SARS-CoV-2 is believed to reach 14 days, nevertheless, the majority of patients develop Covid-19 disease 4–5 days (range between 2 and 7 days) after being infected. Covid-19 remains contagious even during the latency period, thus patients before clinical presentation of Covid-19 can transfer the virus to others.<sup>2</sup> The aims of our study was to find out the otorhinolaryngological manifestations in Covid-19 patients.

### Materials and Methods

Study design was prospective study and sample size was 200. Consent was taken from the patients. Detailed history, physical examination and all the necessary investigations were done for the patients. Proper treatment was given to all the patients. Ethical clearance was obtained from the Ethical Committee of CMH Cumilla. Inclusion Criteria was Laboratory confirmed Covid-19 cases and patients consent for the study. Exclusion Criteria was Patients having history of allergic rhinitis or chronic rhinosinusitis, patients having history of psychiatric disorders. Proper history of all the confirmed Covid-19 patients was taken and clinical examinations were performed. They were also advised to do the necessary blood investigations (routine blood examination, blood sugar level, platelet count, prothrombin time, D-dimer, CRP, LDH, liver & renal function test etc.), electrocardiogram and chest X-rays. These investigations were done in CMH Cumilla. Olfactory functions of the patients were assessed using substances that were easily available like ethanol, scented soap, pepper, coffee etc. Gustatory functions were assessed for the four tastes. All the patients were treated conservatively with injectables, oral medications and nasal irrigation.

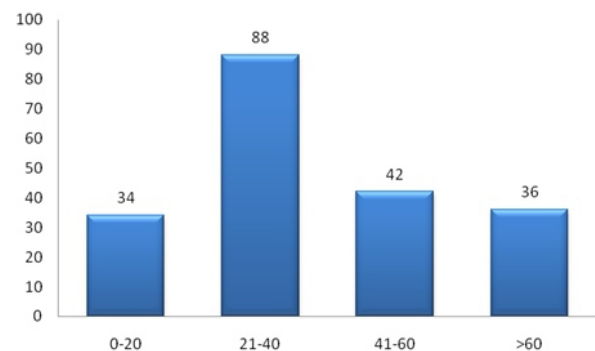
### Results

A total of 200 laboratory confirmed cases were included in the study. Out of these 126 (63%) were males and 74 (37%) were females (Table-I). Among these, maximum number of patients were more than 60 years of age and the least number of cases were seen in 21–40 years of age (Figure I). The most common symptoms with which these patients presented were fever (94%) and cough (85%) and the least common symptoms were malaise, generalized body ache and abdominal symptoms like diarrhea (Table-II). The most common ENT

manifestations with which the patients presented were sore throat (85%) and headache (46%) (Table-III). Out of the 200 patients, 85% complained of otorhinolaryngological problems (Table-IV). Comorbidities (like coronary artery disease, diabetes mellitus, kidney diseases etc.) were seen in 66% of the cases with ENT manifestations and death was seen in 10% of the cases. 78% of the cases with ENT manifestations said to have recovered from the symptoms within 10–20 days. Even after recovery from the primary disease, 22% patients presenting with anosmia/ hyposmia and dysgeusia said to have residual symptoms even after 30 days. All the patients were given symptomatic and supportive treatment.

**Table I:** Gender distribution of the cases (n=200)

Gender	No of cases (n)	Percentage (%)
Male	126	63
Females	74	37
Total	200	100



**Figure I:** Age distribution of the cases (n=200)

**Table II:** Non-ENT manifestations in the cases (n=200)

Non-ENT manifestations	Frequency (n)	Percentage (%)
Fever	188	94
Cough	170	85
Respiratory distress	68	34
Malaise, body ache	70	35
Abdominal symptoms	15	7.5

**Table III:** ENT manifestations in the cases (n=200)

ENT manifestations	Frequency (n)	Percentage (%)
Sore throat	170	85
Headache	92	46
Hyposmia/ anosmia	60	30
Dysgeusia	50	25
Nasal congestion	80	40

**Table IV:** Cases with ENT manifestations (n=200)

ENT/Non-ENT manifestations	Frequency (n)	Percentage (%)
ENT manifestation	170	85
Non – ENT manifestation	30	15
Total	200	100

## Discussion

Covid-19 disease has rapidly spread across the whole world.<sup>3</sup> On February 11, 2020, the WHO named the disease caused by this new virus as Covid-19.<sup>4</sup> The widespread infectivity and distribution of Covid-19 make it an important pathogen with a limitless health threat.<sup>5</sup> Covid-19 manifests with a wide-ranging clinical spectrum, ranging from no symptoms to septic shock and multiple organs dysfunctions. Despite its rapid spread worldwide, the clinical characteristics of Covid-19 remain to a large extent imprecise.<sup>6</sup> The nasal, nasopharyngeal and/or the oropharyngeal tissue are one of the main harbor sites of Covid-19 infection. However, the literature on the ENT manifestations of Covid-19 is still in scarcity. Hence, it is worth studying the ENT manifestations and defining ENT epidemiological and clinical characteristics of Covid-19. In the present study we studied reported and analyzed the different ENT manifestations in confirmed Covid-19 patients and analyzed their relation to other manifestations and to the severity of Covid-19. All the reported ENT manifestations in Covid-19 patients are non specific and therefore, could be easily missed and no emergency ENT symptoms such as nasal bleed or stridor were reported in Covid-19 cases. According to our studies it was found that non-ENT manifestations like fever and cough are more common in Covid-19 patients than ENT manifestations. However it is not uncommon to see the ENT manifestations in these patients. These symptoms

are more commonly seen during the early stages of the disease Otorhinolaryngologists are at high risk due to the close contact with the mucus membrane of the upper respiratory tract. In our study, we found that 85% of the Covid-19 patients presented with ENT manifestations and 15% patients had no ENT manifestations. The most common ENT manifestations were sore throat and headache and the least common symptom was nasal congestion. Hyposmia and dysgeusia were seen in 30% and 25% patients respectively. According to studies, hyposmia and dysgeusia are early symptoms found in Covid-19 patients, occurring in the first 5-7 days.<sup>7</sup> It is recommended to consider patients with these symptoms as Covid-19 suspects and to isolate and test them.<sup>8</sup> This may help in early identification of cases and thus help in breaking the chain of transmission of the disease. No clear predominance of disturbance of taste in particular also could be made. Most of the patients however complained of decrease in sweet and sour taste. Also no significant co-relation was seen between the presence of ENT manifestations and the severity of the disease. A study conducted by Liu Y et al, shows that the severity of clinical picture is related to the viral load.<sup>9</sup> Auditory complications due to Covid-19 infection are little mentioned in the literature.<sup>10</sup> However, studies conducted by Mustafa shows that corona virus can damage cochlear hair cells, despite being asymptomatic, causing reduction in the high frequency pure tone thresholds.<sup>5</sup>

## Conclusion

Fever and cough are the dominant symptoms of Covid-19, but ENT manifestations of Covid-19 are common and should be a part of the suspected clinical criteria for Covid-19. The most common symptoms are sore throat, nasal congestion and obstruction, headache and lastly olfactory dysfunction. A universal questionnaire via well-defined Covid-19 manifestations is required to make the Covid-19 data accurately defined, homogenous and complete.

## References

1. Li LQ, Huang T, Wang YQ, et al. Covid-19 patients' clinical characteristics, discharge rate, and fatality rate of metaanalysis. *J Med Virol.* 2020;92(6): 577–583.
2. Vaira L, Salzano G, Deiana G, De Riu G. Anosmia and ageusia: common findings in Covid-19 patients.

- Laryngoscope. 2020;130(7): 1787.
3. Heller L, Mota CR, Greco DB. Covid-19 faecal-oral transmission: Are we asking the right questions? *Sci Total Environ.* 2020;729: 138919.
  4. Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel corona virus pneumonia (Covid-19) implicate special control measures. *J Med Virol.* 2020;92(6): 568–576.
  5. Mustafa M. Audiological profile of asymptomatic Covid-19 PCR-positive cases. *Am J Otolaryngol.* 2020;41(3): 102483.
  6. Passali G, Bentivoglio A. Comment to the article "Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (Covid-19): a multicenter European study". *Eur Arch Otorhinolaryngol.* 2020;277(8): 2391-2.
  7. Vaira LA, Deiana G, Fois AG, et al. Objective evaluation of anosmia and ageusia in Covid-19 patients: single-center experience on 72 cases. *Head Neck.* 2020;42(6):1252–8.
  8. Kaye R, Chang CWD, Kazahaya K, Brereton J, Denny JC. Covid-19 anosmia reporting tool: initial findings. *Otolaryngol Head Neck Surg.* 2020;163(1): 132–4.
  9. Liu Y, Yang Y, Zhang C, et al. Clinical and biochemical indexes from 2019-nCoV infected patients linked to viral loads and lung injury. *Sci China Life Sci.* 2020;63(3): 364–374.
  10. El-Anwar MW, Elzayat S, Fouad YA. ENT manifestation in Covid-19 patients. *Auris Nasus Larynx.* 2020;47(4): 559–564.



# Awareness and Perception of Covid-19 among the Students of Bangladesh: A Cross Sectional Survey

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## Abstract

**Background:** The novel corona virus disease 2019 (Covid-19) presents an important and urgent threat to global health. Identifying level of public awareness on disease prevention is important to mitigate the pandemic. The aim of this study was to assess the knowledge of the student community of Bangladesh regarding the Corona virus, precautionary habits and trends toward conventional and unconventional methods of treatment, and vaccine. **Methods & Materials:** It was a descriptive cross-sectional online survey conducted among the Bangladeshi students (n=402), aged between 15 to 30 years. For data collection a validated self-administered questionnaire was prepared which was disseminated through social media in the form of a Google Form from 18-25 July, 2021. The questionnaire consisted of 5 demographic characteristics, 18 items on knowledge about Covid-19, 3 questions regarding precautionary habits and 4 questions regarding the trends toward treatment and vaccine. A scoring system was applied to assess awareness among the students. Statistical analysis was conducted to reveal the influence of socio-demographic variables on these scores by using Microsoft Excel. **Results:** In our study, female (13.78±2) had more knowledge than male (13.07±2.13) and science students (13.47±2.10) had better knowledge than non-science students (12.74±2.47). Precautionary habits score had correlation with the age (P<0.001). The participants who had scored better in the knowledge section scored better in the precautionary habits section. The trends toward treatment and vaccine were satisfactory among the students (3.74±0.63). **Conclusion:** The results of this survey indicated that the majority of respondents were aware of the condition, practising preventive measures and are well prepared to fight against Covid-19. Especially, awareness among the female students and the students of the higher educational level were fairly satisfactory. Despite the portrayed awareness levels, governmental involvement is warranted to increase the student's awareness and fill the gaps within their knowledge.

## Introduction

Covid-19 is an infectious disease caused by corona virus (SARS-CoV-2), with an outbreak in 2019 in Wuhan of China leading to a pandemic in 2020 affecting almost every corner of the world and every aspect of lives and livelihood. By the July 16, 2021 the world has seen more than 180 millions confirmed cases with 4.06 millions total deaths.<sup>1</sup> In the meantime, Bangladesh has seen 1.08 millions confirmed cases with 17,465 total deaths.<sup>2</sup> To

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minimize the damage of the live and livelihood from this dire public health situation of the world history, CDC had formulated some personal preventive measures, i.e. wear a mask, stay 6 feet away from others, avoid crowds & poorly ventilated spaces, wash hands often, cover cough

and sneezes, clean & disinfect surroundings and monitor health daily.<sup>3</sup> Expectedly the government of Bangladesh has also taken several well co-ordinated programs to meet the demand of the situation including those adopted by CDC in personal protection plus under the heading of “Bangladesh Preparedness & Response Plan for Covid-19” formation of National Technical Advisory Committee, zoning approach (i.e. red, green, yellow) for lockdown, quarantine (i.e. home and institutional), social distancing and empowerment of healthcare workers.<sup>4</sup> All of the mentioned measures taken by the government of Bangladesh had successfully resisted the first flow of corona but with time the emergence of the new variants of the virus have posed the threat of second flow of the disease. Rigorous steps have been taken by the Bangladesh government to prevent the new blow of the flow but other socio-economic and demographic factors have posed endless hurdles to cope up with the situation. In the meantime, there is the development of vaccination program to build “Herd Immunity” against the disease. But like the other parts of the world, Bangladesh has also seen rumors regarding the vaccines and vaccination program. But the situation reversed readily as the people from different parts of the world started taking vaccines, Bangladeshi people are also less skeptical towards vaccination and this claim can be confirmed by the accelerated vaccination program which is 10,544,425 peoples have taken at least one dose by the 16 July 2021.<sup>5</sup> As a consequence of the development of the current complex situation regarding personal & combined precautionary measures plus participation in the vaccination program, we have chosen the student community of the Bangladesh to conduct an online survey and interpret the results on their current understanding of the disease and mentality towards conventional and unconventional way of treatment and vaccination program to help in rational policy formulation.

### Methodology

The descriptive cross-sectional study was designed based on currently available information about Covid-19 according to the literature and available recommendations. A structured questionnaire had prepared to meet the demand of the objective of the survey. The questionnaire was created, designed and disseminated using the Google Forms platform. From

18-25 July, 2021, the survey was held in online by disseminating the Google form of the questionnaire to different students through Facebook, Messenger groups and E-mails. The questionnaire includes socio demographic information section and 18 questions regarding the knowledge about the Covid-19, 3 questions regarding precautionary habits and 4 questions regarding the trends toward treatment and vaccine. The list of Covid-19 symptoms, route of transmission & prevention measures used in different section of the questionnaire were taken from WHO's current guidelines.<sup>6</sup> The response was enthusiastic and spontaneous.<sup>7</sup> Participants responded to each statement with either “Yes” or “No”. A scoring system was applied, with each correct answer given one point while incorrect answers received zero point. Students of all colleges, universities and medical colleges of Bangladesh were our study population. The students of almost all districts of Bangladesh were allowed to participate in this study. Students from more than 50 districts of Bangladesh were participated voluntarily in this study. Simple random sampling technique was used for selecting the sample of this study. Sample size was 402 and study population was students of different higher secondary and tertiary educational institutes of Bangladesh. Microsoft Excel 2019, Microsoft Excel 2007, Microsoft Word 2019, Google Search Tool & Google Doc. form were used for different statistical analysis of data and interpretation of data. The survey was carried on online through a questionnaire form among the students of higher secondary and higher study/bachelor degree levels with age ranging from 15-30 years. Students who did not meet the above inclusion criteria including students with communication disability and without modern communication devices were, by default, excluded from the study. homotrimers of the S protein, which is composed of an S1 and S2 sub unit. The homotrimeric S protein is a class I fusion protein which mediates the receptor binding and membrane fusion between the virus and host cell. The S1 subunit forms the head of the spike and has the receptor binding domain (RBD). The S2 sub unit forms the stem which anchors the spike in the viral envelope and on protease activation enables fusion. The E and M protein are important in forming the viral envelope and maintaining its structural shape.<sup>1</sup> Infected carriers are able to shed viruses into the environment. Corona viruses

mainly target epithelial cells. They are transmitted from one host to another host, depending on the corona virus species, by either an aerosol or fomite.

## Results

**Table I:** Distribution of respondents according to socio-demographic characteristics (n=402)

Characteristics	Group	Frequency(n)	Percentage(%)
Age	Less than 18	25	6.2
	18 to 24	365	90.8
	25 to 30	12	3
Sex	Male	191	47.5
	Female	211	52.5
Educational Level	Intermediate	86	21.39
	Higher Education/ Bachelor Degree	316	78.61
Educational Discipline	Humanities & Business Studies	42	10.44
	Science Subject	360	89.56

**Table II:** Distribution of respondents according to frequency of sources of awareness (n=402)

Sources of awareness	Frequency(n)	Percentage(%)
Government's official website	95	23.6
Newspaper	116	28.9
Friends and Family members	138	34.3
Television	236	58.7
Doctors and health staff	124	30.8
Social media (facebook, youtube)	356	88.6

**Table III:** Distribution of respondents according to statistical associations between different socio demographic variables and awareness subscales (n=402)

Characteristics	Knowledge regarding Covid-19		Precautionary Habit		Trends towards Treatment	
	Mean±SD	p-value	Mean±SD	p-value	Mean±SD	p-value
<b>Age group</b>						
Less than 18	13.16±2.06		42.92±0.28		3.76±0.83	
18 to 24	13.46±2.10		2.88±0.43		3.73±0.62	
		0.89		1.67		0.188
25 to 30	13.64±2.16		2.82±0.40		3.91±0.30	

## Sex

Male	13.07±2.13	2.81±0.56	3.70±0.66
		0.0007	0.003
			0.209

Female	13.78±2	2.94±0.23	3.78±0.61
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## Educational Level

Intermediate	13.36±2.06	2.85±0.45	3.72±0.75
		0.437	0.461
			0.732

## Higher Education/ Bachelor Degree

Education/ Bachelor Degree	13.47±2.10	2.89±0.42	3.75±0.59
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## Educational Discipline

### Humanities & Business Studies

Business Studies	12.74±2.47	2.79±0.52	3.69±0.84
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		0.053	0.236
			0.656

### Science Subject

Science Subject	13.53±2.03	2.89±0.41	3.75±0.60
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**Table IV:** Distribution of respondents according to frequency of correct responses (n=402)

Variables	Statements	Frequency(n)	Percentage(%)
Symptoms	Fever	392	97.5
	Cough	371	92.3
	Sneezing	261	64.9
	Dyspnea	389	96.8
	Fatigue and Weakness	366	91.04
	Chest pain	181	45
	Diarrhea	244	60.7
	Headache	285	70.9
	Sore throat	361	89.8
	Airborne	285	70.89
Transmission Routes	Contact with contaminated surfaces	322	80.1
	Pets	124	30.8
	Handshaking	366	91
	Hand washing with water and soap	391	97.26
	Precautionary Measurements	Wearing facemask	385
	Avoiding crowded areas	382	95
	Avoiding handshaking	366	91

	Tabij, Panipora, Jharfuk	0	0
	Antibiotics	9	2.2
Treatment options	Kabiraj Treatment	0	0
	Home remedy according to Doctor's Advice	393	97.8
	Pediatric	591	4.7
	Geriatric	324	80.6
	Pregnant	922	2.9
Most Susceptible	Immune deficient people	375	93.28
	May lead to death	382	95.8
	May cause Lung and heart disease	290	72.1
Consequences of attack of Covid-19	May cause weakness and fatigue	293	72.9
	There is no side effect	9	2.2

## Discussion

As the outbreak of Covid-19 is expanding exponentially, spreading beyond borders and across continents. It has been classified as a “pandemic.” It created havoc and dismay among all nations. This new viral infection is successful in inducing restlessness, confusion, and fear among the people. The uniqueness of this infection is that it shows little or no symptoms in the beginning, and many do not even know they are infected. It does not induce any severe change or indication in the infected person so that he can seek medical attention at an early stage. By the time infected persons realize that they are infected, they might have spread the disease to a large number of people without their knowledge and any ulterior motives. Therefore, the first and foremost strategy to win the battle over Covid-19 shall be stopping the spread of disease effectively among the people. Hence, the focus of this research was to assess the awareness of students about the disease, how they prepared themselves to fight against it, and whether they are participating in the eradication of the infection or not. Questionnaire pattern and relevant was determined by the authors by considering the different aspects of the Covid-19 issue and following WHO guidelines.<sup>8</sup> Information related to

the questionnaire was collected from WHO and CDC websites. Bangla translation of the questionnaire was done by following WHO guidelines on questionnaire translation. Among the respondents there was more female (52.5%) than male (47.5%) which is similar to the study of similar topic in Egypt, China and India but opposite to the pattern of respondents in USA in regard to the gender.<sup>9-12</sup> Regarding age group the responses were as follows: 6.2% (n=25) aged less than 18, 90.8% (n=365) aged 18 to 24 years and 3% (n=11) aged 25 to 30 years. There were 86 (21.39%) respondents from intermediate level and 316 (78.61%) respondents from higher study level. Meanwhile, 42 (10.44%) and 360 (89.56%) respondents were from non-science and science subjects respectively. And there were 124 (58.7%), 95 (23.6%), 116 (28.9%), 356 (88.6%), 236 (58.7%) respondents who had their Covid-19 related information from the doctors and health stuffs, government websites, newspapers, social media and television respectively. Our study found a fair knowledge, practising precautionary measures and trends towards treatment and vaccine scores in regard to gender, age, education level and information media but the scores were not satisfactory in case of students with non-science background which will be evaluated in the following paragraphs. The results of our survey showed that social media platforms and television are the main sources of information, from which participants seek Covid-19 related knowledge. Not surprisingly, social media is an important source of information due to its easy accessibility and widespread use. However, given the novelty of Covid-19 and its rapid spread worldwide, the internet and social media platforms are supersaturated with information about the virus, yet a huge portion of this information is misleading.<sup>15</sup> It's evident from the literature that both social media and health care workers are the primary sources of information during times of crisis.<sup>16-19</sup> However, studies show that European respondents from Netherlands, Germany and Italy, and Australian citizens utilized traditional media (e.g. television, and news) as their primary sources of information regarding the Covid-19 pandemic.<sup>20,21</sup> Such phenomenon could be attributed to the fact that in these countries, official governmental reports regarding the virus are broadcasted on traditional media. Knowledge regarding the Covid-19 was satisfactory in regard to the gender, age, educational level. But there was a variation in the context of

education discipline which is that the knowledge score was bit lower in case of students from non-science discipline which can be related with the absence of such sort of scientific topics in the academic plan for non-science students. In our study, female had more knowledge score than male regarding symptoms, way of transmission of the virus and epidemiological demarcation of the Covid-19. This sort of findings may be attributed to greater precautionary attitudes of women which evidenced from a research demonstrating the relation between precautionary behavior and gender.<sup>13</sup> But the overall good scoring in the knowledge section may be attributed to student's better access to the uptodate information as a consequence of the digital transformation of the country. Precautionary habits score was enormously good among the study population. Meanwhile, students from science discipline had scored more than their counterparts of non-science disciplines. In case of this study, it can be attributed to “the better the knowledge the greater the precautionary habits.” That's, students who scored better in knowledge section showed that he/she was practicing precautionary habits accurately. The trends toward treatment and vaccine were good among the study population. Almost all of them answered with 90% or more accuracy. Though there was a period of extensive rumor about the unconventional and conventional treatment approach, the score didn't see any adverse effect of it. It may be due to character of the study population, that's as we had chosen students as our study population, they usually have better knowledge regarding any issues than the illiterate persons which revealed in search paper in Bangladesh regarding KAP (knowledge, Attitude, Practicing) of Covid-19.<sup>14</sup> Enormous circulation of Covid-19 treatment and vaccine related information across all the media including student's better access and understanding of the information may have played role in their less skepticism toward treatment and vaccines. After all, our study had some limitations as it was conducted with limited resources i.e. the use of online surveys, that are primarily disseminated through social media platforms, enabled us to recruit a larger and more diverse sample of participants within a short period of time.<sup>22</sup> Online surveys had engaged college and university/ medical students which exclude the responses of primary and secondary students due to their limited accessibility to technology.

## Conclusion

Significant knowledge regarding the virus, practicing precautionary measures and showing less skepticism to the scientific way of treatment and vaccination are the keys to cope up with this dire public health situation in country like Bangladesh where resources are not readily available to fight a catastrophe. In the study, knowledge, precautionary habit and trends toward treatment and vaccine scores were good among female students and students of science disciplines. On the other hand, the scores were bit low in case of male and students of non-science disciplines. Moreover, higher knowledge score was related to higher score in practicing precautionary habits. It is recommend that further studies regarding this issue may be conducted with more variables (e.g. economic impact, social impact, and personality impact) and more structured questionnaire to reach a better conclusion to influence the policy formulation of the Government of Bangladesh.

## References

1. Covid-19 situation in the world; <https://covid19.who.int>.
2. Covid-19 situation in Bangladesh; <https://covid19.who.int-bd>.
3. Personal precautionary measure; <https://www.cdc.gov>.
4. Bangladesh Preparedness and Response Plan for Covid-19; <https://mohfw.gov.bd>.
5. Covid-19 situation in Bangladesh; <https://covid19.who.int-bd>.
6. Covid-19 symptoms and transmission routes; <http://who.int/emergencies/diseases/novelcoronavirus-2019/questions-answershub/qadetail>.
7. WHO ethical guidelines on research; <http://apps.who.int/iris/bitstream/handle/10665/255721/9789241512657-eng.pdf?sequence=1>.
8. WHO | Process of translation and adaptation of instruments [Internet]. Who.int.2020 [cited 17 August2020].[https://www.who.int/substance\\_abuse/research\\_tools/translation/en/](https://www.who.int/substance_abuse/research_tools/translation/en/)
9. Abdelhafiz A, Mohammed Z, Ibrahim M, et al. Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Corona virusDisease (Covid-19). *Journal of Community Health*. 2020;45:881-890.
10. Zhong B, Luo W, Li H, et al. Knowledge, attitudes, and practices towards Covid-19 among Chinese

- residents during the rapid rise period of the Covid-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*. 2020;16(10):1745–52.
11. Roy D, Tripathy S, Kar S, Sharma N, Verma S, Kaushal V. Study of Knowledge, Attitude, anxiety & perceived mental healthcare need in Indian population during Covid-19 pandemic. *Asian Journal of Psychiatry*. 2020; 51:102083.
  12. Clements JM. Knowledge and Behaviors toward Covid-19 Among US Residents During the Early Days of the Pandemic: Cross-Sectional Online Questionnaire. *JMIR Public Health and Surveillance*. 2020; 6(2):1-11 .
  13. Lesile-Anne Keown Precautions taken to avoid victimization: A gender perspective. <https://www150.statcan.gc.ca/n1/pub/11-008-x/2010001/article/11123-eng.htm>.
  14. Hossain MA. Knowledge, attitudes, and fear of Covid-19 during the Rapid Rise Period in Bangladesh <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239646>.
  15. Cuan-Baltazar JY, Munoz-Perez MJ, Robledo-Vega C , Perez-Zepeda MF, Soto-Vega E . Misinformation of Covid-19 on the Internet: Infodemiology Study. *JMIR Public Heal Surveill*. 2020;6(2): 1-9.
  16. Roy D, Tripathy S, Kumar S, Sharma N. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during Covid-19 pandemic. *Asian Journal of Psychiatry*. 2020;51: 1-7.
  17. Nooh HZ, Alshammary RH, Alenezy JM, et al. Public awareness of corona virus in Al-Jouf region, Saudi Arabia. *Journal of Public Health: From Theory to Practice*. 2021;29:1107–1114.
  18. Bawazir A, Al-mazroo E, Jradi H, Ahmed A, Badri M. MERS-CoV infection: Mind the public knowledge gap. *Journal of Infection and Public Health*. 2018;11: 89–93.
  19. Kwok KO, Kwok KO, Kwok KO, et al. Community Responses during Early Phase of Covid-19 Epidemic, Hong Kong. *Emerg Infect Dis*. 2020;26:1575–9.
  20. Seale H, Heywood AE, Leask J, et al. Covid-19 is rapidly changing: Examining public perceptions and behaviors in response to this evolving pandemic. *PLoS One*. 2020;15: 1-13.
  21. Meier K, Glatz T, Guijt MC, et al. Public perspectives on precautionary measures during the Covid-19 pandemic in the Netherlands, Germany and Italy: A survey study. *PLoS One*. 2020; 15:1–17.
  22. Kosinski M, Matz SC, Gosling SD, Popov V, Stillwell D. Facebook as a research tool for the social sciences: Opportunities, challenges, ethical considerations, and practical guidelines. *Am Psychol*. 2015;70: 543–56.

## Outline of Death Due to Flame Burn Injuries

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### Abstract

**Background:** Annually flame burn injuries take away precious human lives and destroy human properties in Bangladesh. This study was conducted to evaluate the demographic pattern and causative factors related to flame burn deaths. **Materials and Methods:** A retrospective cross sectional autopsy based study of three years was carried out by taking history of the case, inquest report and by doing thorough autopsy of each of the cases at Sir Salimullah Medical College Mortuary. **Results:** A total of 1310 cases of flame burn accounted for 15.78% of the total 8300 medico legal autopsies of them 816 female (62.29%) and 494 males (37.70%). The most affected age group was 21-40 years in which 277 (21.10%) males and 564 (43.05%) females. Most of the victims were married comprising of 230 (17.55%) males and 548 (41.83%) females. Urban cases were 912 (69.61%) outnumbered the rural cases 398 (30.38%). Muslims were the major victims 802 cases (61.22%) among all in relation to religion. Garments workers were the commonest female victims 299 (22.82%), while businessmen 483 (25.58%) were the commonest among the male victims. Garments factories 498 cases (38.01%) were the commonest place of incidence. Shock was the commonest causes of death in 706 cases (53.89%). Majority of the cases were accidental 1196 cases (91.29%). **Conclusion:** Morbidity and mortality owing to flame burns can be prevented effectively by adopting awareness and safety measures.

**Key Words:** Flame burn, Death, Victims, Postmortem examination

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### Introduction

Many people of the world believe that the whole universe is composed of five essential elements namely water, air, earth, sky and fire.<sup>1</sup> Mankind has been using fire since stone age to add to his comforts. But it has also added to his anguish by increasing the likelihood of burns to his

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body, property etc.<sup>2</sup> Flame is the luminous irregular appearance usually go with a combustion.<sup>3</sup> Flame is

beneficial till it is under the flame of watchfulness, beyond this it leads to a holocaust for mankind. Several episodes are in the history of mankind where major calamities are caused by a tiny brisk of flame.<sup>4</sup> From medical point of view "Injury" means blunt or penetrating trauma or damage to a part of the body.<sup>5</sup> And from medicolegal point of view "Injury" is any harm whatever illegally caused to any person in body, mind, reputation or property.<sup>6</sup> Burn is a tissue injury due to application of heat in any form to the external or internal body surface.<sup>7</sup> Burn injuries have long been described as among the most serious injuries to affect a man.<sup>8</sup> The effects of burning mainly depend upon: a) Temperature and duration of exposure, b) Extent and position of burns and c) Age of the victim.<sup>9</sup> Causes of death in burns include shock, suffocation, accident/injuries as the immediate cause and among delayed causes toxemia and inflammatory complications.<sup>10</sup> Incidence of burns could be due to building catching fire, clothes worn catching fire, inflammable liquid fire explosions, industrial furnace burn etc.<sup>11</sup> Accident is the most common manner of burn. Burns is a significant mode of suicide and homicide in many countries.<sup>12</sup> They are the 4th most common type of trauma worldwide, following traffic accidents, falls and interpersonal violence and have an immense medicolegal significance.<sup>13</sup> The aetiological factors in relation to these very injuries may diversify in different territories and communities. Hence, thorough epidemiological studies have to be done regarding flame burn deaths in different territories of the country. Aims and Objectives of our study was to determine the demographic pattern of flame burn deaths, to search for various factors in relation to flame burns, to search for the risk factors and vulnerable groups to control the incidence of flame burn deaths, to initiate appropriate measures to prevent the further occurrence of flame burns.

### Materials and Methods

This is a retrospective cross-sectional study conducted at Sir Salimullah Medical College Mortuary during the period from 01/01/2009 to 31/12/2011. An exploration of medicolegal autopsy records revealed 1310 (15.78%) flame burn deaths out of the total 8300 autopsies done over the study period of three years. All the cases of flame burn deaths were brought to the mortuary of Sir Salimullah Medical College for medicolegal autopsy examination. Thorough, detailed and complete autopsy examinations of the dead bodies were done. All the

informations regarding age, sex, address, occupation, marital status, religion, date and time of incidence, date and time of death were collected from the Police Inquest Reports, Hospital Records and Case files. These informations were then compiled, tabulated and analyzed.

**Table I:** Year wise Distribution

Year	Total No of P.M Examination	Cases of Flame Burn Deaths	Percentage (%)
2009	2600	392	15.07
2010	2800	444	15.85
2011	2900	474	16.34
Total	8300	1310	15.78

**Table II:** Age & sex wise distribution

Year	2009	2010	2011	2012
Age & Sex	n	n	n	n
	%	%	%	%
Male	22	31	49	102
0-20	(5.61)	(6.98)	(10.33)	(7.78)
Male	87	93	97	277
21-40	(22.19)	(20.94)	(20.46)	(21.10)
Male	43	39	33	115
41-80	(10.96)	(8.78)	(6.96)	(8.77)
Female	27	47	57	131
0-20	(6.88)	(10.58)	(12.20)	(10)
Female	165	196	203	564
21-40	(42.9)	(44.14)	(42.82)	(43.05)
Female	48	38	35	121
41-80	(12.24)	(8.55)	(7.38)	(9.23)

**Table III:** Distribution according to sex

Year	Total	Male n(%)	Female n(%)
2009	392	152 (38.77)	240 (61.22)
2010	444	163 (36.71)	281 (63.28)
2011	474	179 (37.76)	295 (62.23)
2009-2011	1310	494 (37.70)	816 (62.29)



**Table IV:** Distribution according to marital status

Year	2009	2010	2011	2009-2011
	n	n	n	n
	(%)	(%)	(%)	(%)
Married	89	74	67	230
(Male)	(22.70)	(16.66)	(14.13)	(17.55)
Unmarried	49	68	86	203
(Male)	(12.50)	(15.31)	(18.14)	(15.49)
Unknown	14	21	26	61
(Male)	(3.57)	(4.72)	(5.48)	(4.65)
Married	168	179	201	548
(Female)	(42.85)	(40.31)	(42.40)	(41.83)
Unmarried	52	70	81	203
(Female)	(13.26)	(15.76)	(17.08)	(15.49)
Unknown	20	32	13	65
(Female)	(5.10)	(7.20)	(2.74)	(4.96)

**Table V:** Area wise distribution of burn cases

Year	Total	Total Urban 912 cases		Total Rural 398 cases	
		(69.61%)		(30.38%)	
		Male	Female	Male	Female
2009	392	102	178	50	62
2010	444	119	209	44	72
2011	474	147	226	32	69
2009-2011	1310	368	613	126	203
	(28.09%)	(46.79%)	(9.61%)	(15.49%)	

**Table VI:** Religion of the Victims (Male & Female combined)

Year	2009	2010	2011	2009-2011
	n	n	n	n
	(%)	(%)	(%)	(%)
Muslims	230	278	294	802
	(58.67)	(62.61)	(62.02)	(61.22)
Hindus	92	87	104	243
	(23.64)	(19.59)	(21.94)	(21.60)
Christians	26	19	23	68
	(6.63)	(4.27)	(4.85)	(5.19)
Buddhists	10	07	14	31
	(2.55)	(1.57)	(2.95)	(2.36)
Unknown	34	53	39	126
	(8.67)	(11.93)	(8.22)	(9.61)
Total	392	444	474	1310

**Table VII:** Occupation of the male victims

Year	2009	2010	2011	2009-2011
				n (%)
Govt.	09	07	16	35(1.85)
Private	37	55	49	173(9.1)
Businessmen	32	142	199	483(25.58)
Students	05	02	07	14(0.74)
Unknown	16	18	14	48(2.54)

**Table VIII:** Occupation of the Female Victims

Year	2009	2010	2011	2009-2011
				n (%)
Govt.	11	16	13	40(3.05)
Private	57	53	45	155(11.83)
Garment's Worker	86	94	119	299(22.82)
Students	07	12	24	43(3.28)
Unknown	20	32	13	65(4.96)

**Table IX:** Place of Incidence

Year	2009	2010	2011	2009-2011
	n(%)	n(%)	n(%)	n(%)
Garments	142	156	200	498
Factory	(36.22)	(35.13)	(42.19)	(38.01)
Kitchen	102	112	97	311
	(26.02)	(25.22)	(20.46)	(23.74)
Other places	148	176	177	501
	(37.75)	(39.63)	(37.34)	(38.24)

**Table X:** Number of cases as per cause of death

Year	2009	2010	2011	2009-2011
	n(%)	n(%)	n(%)	n(%)
Shock	212	232	262	706
	(54.08)	(52.25)	(55.27)	(53.89)
Toxaemia	28	37	44	109
	(7.14)	(8.33)	(9.28)	(8.32)
Septicaemia	152	175	168	495
	(38.77)	(39.41)	(35.44)	(37.78)

**Table XI:** No of cases as per mode of Death

Year	2009 n(%)	2010 n(%)	2011 n(%)	2009-2011 n(%)
Accidental	356 (90.81)	407 (91.66)	433 (91.35)	1196 (91.29)
Suicida	130 (7.65)	26 (5.85)	32 (6.75)	88 (6.71)
Homicidal	06 (1.53)	11 (2.47)	09 (1.89)	26 (1.98)

### Discussion

This study reveals 1310 flame burn deaths comprising 15.78% of the total 8300 medicolegal autopsies during the study period of three years. In 2009 we observed 392 flame burn deaths comprising 15.07% of the total 2600 medicolegal autopsies. In 2010 we observed 444 flame burn deaths (15.85%) out of the total 2800 medicolegal autopsies and in 2011 we observed 474 flame burn deaths comprising 16.34% of the total 2900 medicolegal autopsies done at Sir Salimullah Medical College Mortuary. Similar Indian study shows 381 cases of flame burn deaths comprising 19% of the total 2042 medicolegal autopsies.<sup>14</sup> Majority of the victims were from the age group of 21-40 years in case of male, 277 cases (21.10%) followed by the age group of 41-80 years 115 cases (8.77%) and the age group of 0-20 years 102 cases accounting for 7.78% of the total 1310 flame burn deaths. Whereas in case of female most of the victims were also from the age group of 21-40 years 564 cases (43.05%) followed by the age group 0-20 years, 131 cases (10%) and the age group of 41-80 years, 121 cases comprising 9.23% of the total 1310 flame burn deaths. Similar Indian study shows that the age group of 21-30 years accounted for the most of the cases 149 (39%) followed by the age group of 31-40 years, 92 cases (24%) and the age group 11-20 years, 76 cases (20%). In the males, the age group of 21-30 years, 47 cases (34%) followed by the age group of 31-40 years, 43 cases (31%) and then by the 41-50 years 20 cases (14%). Whereas in the females the age group of 21-30 years, 102 cases (42%) was followed by the age group of 10-20 years, 57 cases (24%) and the age group of 31-40 years, 49 cases comprising 20% of the total flame burn deaths.<sup>14</sup> Female victims were on top of the table as far as sex is concerned

816 cases (62.29%) and we observed 494 male victims accounting for 37.70% of the total 1310 flame burn deaths. Similar Indian study shows the male: female ratio in flame burn deaths was 1:1.7.14 In case of male majority of the victims were married 230 cases (17.55%) followed by unmarried 203 cases (15.49%) and unknown 61 cases comprising 4.65% of the total 1310 flame burn deaths. We also observed the similar records in case of female married victims 548 cases (41.83%) outnumbered the unmarried group 203 cases (15.49%) and the unknown group 65 cases comprising 4.96% of the total 1310 flame burn deaths. Similar Indian Study shows that about half 189 cases (49.6%) of flame burn deaths were accounted for by married females, whereas married males comprised only 97 cases (25%), while in the unmarried category, they comprised 42% (37 cases). Urban victims 912 cases (69.61%) outnumbered the victims from the rural areas 398 cases comprising 30.38% of the total 1310 flame burn victims. Similar study was done in India which shows 70% of male victims and 64% of the female victims were from the rural areas. Overall 66% victims were from rural background.<sup>14</sup> Muslims were the main victims 802 cases (61.22%), followed by Hindus 283 cases (21.60%), Unknown 126 cases (9.61%), Christians 68 cases (5.19%) and Buddhists 31 cases comprising 2.36% of the total 1310 flame burn deaths. Similar Indian study shows most of the victims were Hindus 234 cases (61%) followed by the Sikhs 129 cases (34%) and the least numbers were Muslims 18 cases comprising 5%.<sup>14</sup> In case of female garments workers i.e 199 cases (15.19%) outnumbered the private job holders 106 cases (8.09%), businessmen 93 cases (7.09%), unknown 61 cases (4.65%), govt. job holders 19 cases (1.45%) and the students 16 cases comprising 1.22% of the total. In case of female victims garments workers were also on top of the table 299 cases (22.82%) followed by housewives 214 cases (16.33%), private job holders 155 cases (11.83%), unknown 65 cases (4.96%), students 43 cases (3.28%) and govt. job holders 40 cases comprising 3.05% of the total flame burn deaths. Similar study in India shows that occupation wise, 80% (112) of male victims were in service either govt. or in private as compared to 14.5% (35) females. Around 66% (158) of the female victims were housewives and of the married female victims, 84% were housewives. In the category of students, female victims outnumbered male by 38:1.<sup>14</sup> In

501 cases (38.24%) kitchen were on top of the table in relation to place of incidence followed by garments factories 498 cases (38.01%) and Kitchen 311 cases accounting for 23.74% of the total 1310 flame burn deaths. Similar Indian study shows that kitchen was the commonest place of incidence, accounting for overall 76% (256). Most of the victims died due to shock 706 cases (53.89%) followed by septicaemia 495 cases (37.78%) and toxemia 109 cases comprising 8.32% of the total 1310 flame burn deaths. Similar Indian study shows that most of the victims died as a result of septicaemia 67 cases (56.77%) followed by shock 46 cases (39%) and toxemia 5 cases comprising 4.6%.<sup>4</sup> In maximum cases manner of death were accidental 1196 cases (91.29%) followed by suicidal 88 cases (6.71%) and homicidal 26 cases accounting for 1.98% of the total 1310 flame burn deaths. Similar study was done in India which shows that 214 cases (92.24%) were of accidental followed by 15 cases (6.46%) were of suicidal and 3 cases were of homicidal comprising 1.37%.<sup>4</sup>

### Conclusion

This autopsy based retrospective study has given emphasis on some important factors pertaining to flame burn deaths in Bangladesh. Accident was the prime manner of death. Most of the victims died due to shock followed by septicaemia and toxemia. It will be a big challenge on our part to prevent burn injuries. Meanwhile, it is not impossible to reduce morbidity and mortality due to flame burn through collective measures aimed to reduce the likelihood of incidence of fire and by reducing the severity & impact of a flame burn injury. More research works have to be carried out regarding flame burn deaths across the country and continent as annually these mishaps take away precious human lives and put a lot of negative impact on the national economy.

### References

1. Chawla R, Charana A. A two year Burns Fatality Study. *JIAFM*. 2010; 32(4): 292-7.
2. Gupta R, Kumar V, Tripathi SK. Profile of the fatal

- burn deaths from the Varanasi region, India. *J Clin and Diag Res*. 2012;6(4): 608-611.
3. India: Elsevier Saunders Dorland's Pocket Medical Dictionary, 29th ed: 2013. p: 303.
4. Anupam J, Mathur RK, Ashuthosh S. Study on the Medicolegal Aspects of flame burn deaths, *IRMPS*. 2015;1(4): 35-40.
5. Taber's Cyclopedic Medical Dictionary, 21st ed, Devis FA Company, Philadelphia, 2015, p: 1200.
6. Reddy KSN, Murty OP. The Essentials of Forensic Medicine and Toxicology, 33rd ed, Jaypee The Health Science Publishers, New Delhi, 2016, p: 290-1.
7. Rajesh B. Principles of Forensic Medicine and Toxicology 1st ed. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, 2011, p: 260.
8. Reddy KSN, The Essentials of Forensic Medicine and Toxicology, 29th ed. K. Suguna Devi Publishers, 2009, p: 283.
9. Parikh CK. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology for Classrooms and Courtrooms, 6th ed. CBS Publishers and Distributions Pvt. Ltd, New Delhi 110 002, p: 4.153.
10. Krishan V. Textbook of Forensic Medicine and Toxicology Principles and Practice, 4th ed, Elsevier A division of Reed Elsevier India Pvt Ltd, p 216-7.
11. Nageshkumar GR. Textbook of Forensic Medicine and Toxicology, 1st ed Reprint, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, 110002, p 248.
12. Van R, Olga JL, Bouter LN, Meertens RM. The aetiology of burns in developed countries. 1989(4), available at [www.aetiologofburninjuries.com](http://www.aetiologofburninjuries.com).
13. Pekka S, Knight B. Bernard Knight's Forensic Pathology, 2004, 3rd ed, Oxford University Press Inc, New York, p 322.
14. Harish D, Kaur C, Singh A, Kumar A. A Comprehensive Analysis of Death due to Burns in a Tertiary Care Centre. *J Punjab Acad Forensic Med Toxicol*, 2013;13(2): 68-73.

## Status of Vitamin-D in Type-2 Diabetes Patients Attending in a Tertiary Hospital of Bangladesh

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### Abstract

**Background:** Type 2 diabetes mellitus (T2DM) is a chronic metabolic disease that is characterized by insulin resistance and  $\beta$ -cell dysfunction. Vitamin D deficiency is common in patients with T2DM. Vitamin D status may have a causal role in the onset of T2DM and may influence the glycemic control in these patients. However, data on vitamin D status among Bangladeshi T2DM patients are scarce. **Objective:** To assess the status of vitamin D in type 2 diabetic patients attending in a tertiary level of diabetic hospital. **Methodology:** This cross-sectional study was done among the diagnosed 115 T2DM patients attending in outpatient department of Cumilla Diabetic Hospital, Bangladesh to address this lacuna. Serum 25(OH) D was measured in all and classified as normal ( $\geq 30$  ng/mL), insufficient ( $>20$  to  $29.9$  ng/mL), and deficient ( $\leq 20$  ng/mL). **Results:** Mean serum vitamin D was found to have  $25.6 \pm 12.0$  ng/dl. Among the study subjects, 37.4% were deficient, 32.2% were insufficient and 30.4% had normal 25(OH) D. There was no statistical difference of 25(OH) D level between the younger and older patients; males and females; among smokers, non-smokers and ex-smokers; among normal weight, overweight and obese; and among normotensive, borderline hypertensive and hypertensive patients. Serum 25(OH) D level showed significant positive correlation ( $r=0.199$ ;  $p=0.033$ ) with HbA1c and negative correlation ( $r=-0.197$ ;  $p=0.035$ ) with BMI in type 2 diabetic patients. Other variables were not statistically significant ( $p>0.05$ ). Age, sex, systolic BP, diastolic BP, family history of DM and smoking status were not found to influence vitamin D level independently. **Conclusion:** Our study found high frequency 69.6% of subnormal (deficient and insufficient) level of vitamin D in diagnosed T2DM patients. High BMI and mean HbA1c were significant correlate with Vitamin D level.

**Key words:** Vitamin D deficiency, Type 2 Diabetes

### Introduction

Diabetes mellitus (DM) is a metabolic disorder affecting about 415 million people worldwide. In 2015, Bangladesh ranked 10th in the world with a total of 7.1 million diabetic people and it is estimated that in 2040 around 13.6 million of her people will have diabetes, making 9th in the ranking at that time.<sup>1</sup> Diabetes is multifactorial in origin, and is caused by interplay of several environmental as well as genetic factors. Vitamin

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D, a fat soluble vitamin discovered in 1922 by McCollum, is mostly synthesized in the skin on exposure to sun and a small amount from diet including fish, milk, yogurt, orange juice and cereals.<sup>2</sup> Vitamin D status is an excellent marker of 'good health', including positive associations with young age, normal body weight and a

healthy lifestyle. Vitamin D plays vital roles in bone metabolism and in the regulation of intestinal absorption of minerals such as calcium and phosphorus. Various studies suggest that vitamin D deficiency may play a major role in the causation of T2DM and some other chronic diseases like hypertension, cardiovascular disease.<sup>3-7</sup> Vitamin D may also play role in glycemic control in DM.<sup>8,9</sup> Serum 25-hydroxy vitamin D [25(OH)D] levels reflect body stores of vitamin.<sup>10</sup> Worldwide vitamin D deficiency is a common problem in general population.<sup>11</sup> Although vitamin D deficiency is unexpected in a tropical areas like Indian subcontinent, several cross-sectional studies found very high prevalence of vitamin D deficiency even among healthy individuals of various subsets of this population.<sup>12-14</sup> Recent studies have reported very high prevalence of subnormal vitamin D in T2DM patients in this subcontinent though some of those studies reported that the prevalence was not significantly higher when compared to normal individuals.<sup>15-17</sup> There is lack of data on the prevalence of vitamin D deficiency among Bangladeshi T2DM patients. Hence, this study was undertaken to investigate the vitamin D status in diagnosed T2DM patients in this area.

### Methods and Materials

This cross-sectional study comprising of 115 diagnosed T2DM patients was conducted in the outpatient department of Cumilla Diabetic Hospital, Bangladesh from January 2020 to December 2020. Diabetes was diagnosed on the basis of American Diabetes Association (ADA) 2017 Criteria.<sup>18</sup> Informed written consent was taken from each subject. Patients having history of poor sunlight exposure; liver, kidney or thyroid dysfunction; malignancy, recent severe acute illness; strict vegans and those taking vitamin D supplements were discarded. Venous blood of 5 ml was collected from each participants, serum separated by centrifugation and preserved until assay. Serum 25(OH) D was estimated by chemiluminescent immunoassay procedure (Vitros-ECI, Ortho-Clinical Diagnostics, 100 Indigo Creek Drive, Rochester NY 14626, USA.) level of 25 (OH)D were considered as normal ( $\geq 30$ ng/mL), insufficient ( $>20$  to 29.9 ng/mL) and deficient ( $\leq 20$ ng/mL) as per Clinical Practice Guidelines (2011) of The Endocrine Society.<sup>19</sup> Obesity status was determined by body mass index (BMI) categories applicable for the Asian Indians.<sup>20</sup>

Data were analyzed by using Statistical Packages for Social Sciences (SPSS), version 23.0 software (SPSS Inc; Chicago, IL, USA). The categorical variables were represented as percentages and measurable variables as mean $\pm$ SD. Independent sample t test, Chi-square test were performed as applicable for comparing the variables between different groups. Pearson's correlation test was done to find out the association among different variables, and regression model was applied to identify the confounding variables. P value  $\leq 0.05$  was considered to be statistically significant.

### Results

The study subjects are divided into two groups on the basis of their 25(OH) D level, normal ( $\geq 30$  ng/mL) and subnormal which include insufficient ( $>20$  to 29.9 ng/mL) and deficient ( $\leq 20$  ng/mL). Majority (37.4%) patients were found with serum vitamin D level  $\leq 20.0$  ng/dl. Mean serum vitamin D was found to have 25.6 $\pm$ 12.0 ng/dl with a range from 8.1 to 68.4 ng/dl (Table-I). Age, sex and residence were not statistically significant ( $p > 0.05$ ) between two group (Table-II). Smoking, hypertension and obesity were not statistically significant ( $p > 0.05$ ) between two group (Table-III). Mean age was found 41.8 $\pm$ 11.2 years in sub-normal vitamin D group and 46.1 $\pm$ 12.2 years in normal vitamin D group. The mean BMI was found 26.8 $\pm$ 3.5 kg/m<sup>2</sup> in sub-normal vitamin D group and 25.5 $\pm$ 3.5 kg/m<sup>2</sup> in normal vitamin D group. The mean SBP was found 129.4 $\pm$ 14.3 mmHg in sub-normal vitamin D group and 129.7 $\pm$ 14.6 mmHg in normal vitamin D group. The mean DBP was found 82.5 $\pm$ 5.6 mmHg in sub-normal vitamin D group and 82.3 $\pm$ 6.5 mmHg in normal vitamin D group. The mean HbA1c was found 8.2 $\pm$ 1.1 percent in sub-normal vitamin D group and 8.7 $\pm$ 1.8 percent in normal vitamin D group. The mean TC was found 191.8 $\pm$ 45.8 mg/dl in sub-normal vitamin D group and 218.1 $\pm$ 132.9 mg/dl in normal vitamin D group. The mean TG was found 243.1 $\pm$ 200.9 mg/dl in sub-normal vitamin D group and 283.1 $\pm$ 445.0 mg/dl in normal vitamin D group. The mean LDL was found 130.6 $\pm$ 30.7 mg/dl in sub-normal vitamin D group and 125.9 $\pm$ 33.9 mg/dl in normal vitamin D group. The mean HDL was found 39.7 $\pm$ 7.4 mg/dl in sub-normal vitamin D group and 38.8 $\pm$ 8.0 mg/dl in normal vitamin D group. The differences were not statistically significant ( $p > 0.05$ ) between two group (Table-IV).

**Table I:** Distribution of the study patients by vitamin-D level (n=115)

Vitamin-D (ng/mL)	Frequency	Percentage
Deficient ( $\leq 20.0$ ng/mL)	43	37.4
Insufficient (20.1 to 29.9 ng/mL)	37	32.2
Normal ( $\geq 30$ ng/mL)	35	30.4

**Table II:** Distribution of the study patients according to demographic characteristics (n=115)

Demographic characteristics	Sub-normal (n=80)		Normal (n=35)		P value
	n	%	N	%	
<b>Age (years)</b>					
$\leq 30$	11	13.75	6	17.14	0.175 <sup>ns</sup>
31-40	29	36.25	9	25.71	
41-50	26	32.5	7	20.00	
51-60	11	13.75	10	28.57	
>60	3	3.75	3	8.57	
<b>Sex</b>					
Male	35	43.75	16	45.71	0.845 <sup>ns</sup>
Female	45	56.25	19	54.29	
<b>Residence</b>					
Abroad	7	8.75	2	5.71	0.740 <sup>ns</sup>
Rural	47	58.75	23	65.71	
Urban	26	32.5	10	28.57	

ns= not significant

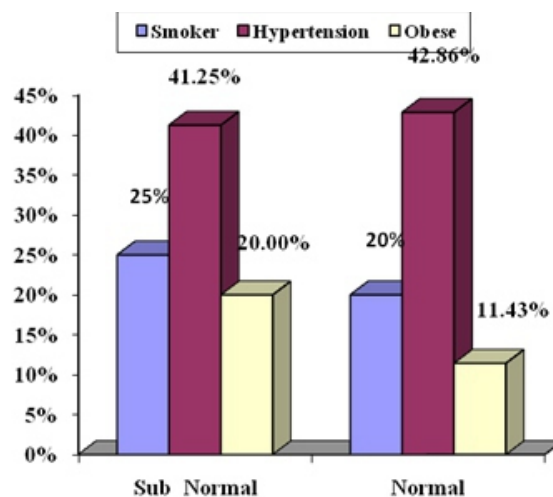
P value reached from chi square test

**Table III:** Distribution of the study patients according to co-morbidities (n=115)

Co-morbidities	Sub-normal (n=80)		Normal (n=35)		P value
	N	%	n	%	
Smoker	20	25.00	7	20.00	0.561 <sup>ns</sup>
Hypertension	33	41.25	15	42.86	0.872 <sup>ns</sup>
Obese	16	20.00	4	11.43	0.264 <sup>ns</sup>

ns= not significant

P value reached from chi square test

**Figure I:** Distribution of the study patients according to co-morbidities**Table IV:** Distribution of the study patients according to different variables (n=115)

Investigations	Sub-normal (n=80)	Normal (n=35)	P value
	Mean $\pm$ SD	Mean $\pm$ SD	
Age (years)	41.8 $\pm$ 11.2	46.1 $\pm$ 12.2	0.071 <sup>ns</sup>
BMI (kg/m <sup>3</sup> )	26.8 $\pm$ 3.5	25.5 $\pm$ 3.5	0.060 <sup>ns</sup>
SBP (mmHg)	129.4 $\pm$ 14.3	129.7 $\pm$ 14.6	0.908 <sup>ns</sup>
DBP (mmHg)	82.5 $\pm$ 5.6	82.3 $\pm$ 6.5	0.858 <sup>ns</sup>
HbA1c (%)	8.2 $\pm$ 1.1	8.7 $\pm$ 1.8	0.083 <sup>ns</sup>
TC (mg/dl)	191.8 $\pm$ 45.8	218.1 $\pm$ 132.9	0.117 <sup>ns</sup>
TG (mg/dl)	243.1 $\pm$ 200.9	283.1 $\pm$ 445.0	0.503 <sup>ns</sup>
LDL (mg/dl)	130.6 $\pm$ 30.7	125.9 $\pm$ 33.9	0.462 <sup>ns</sup>
HDL (mg/dl)	39.7 $\pm$ 7.4	38.8 $\pm$ 8.0	0.580 <sup>ns</sup>

ns= not significant

P value reached from unpaired t-test

**Table V:** Correlation of age, BMI, SBP, DBP, HbA1c, TC, TG, LDL and HDL with vitamin-D level (n=115)

Variables	Vitamin-D level	
	r value	P value
Age (years)	0.242	0.009 <sup>s</sup>
BMI (kg/m <sup>3</sup> )	-0.197	0.035 <sup>s</sup>
SBP (mmHg)	0.052	0.584 <sup>ns</sup>
DBP (mmHg)	0.019	0.840 <sup>ns</sup>
HbA1c (%)	0.199	0.033 <sup>s</sup>

Variables	Vitamin-D level	
	r value	P value
TC (mg/dl)	0.154	0.099 <sup>ns</sup>
TG (mg/dl)	0.121	0.197 <sup>ns</sup>
LDL (mg/dl)	-0.015	0.873 <sup>ns</sup>
HDL (mg/dl)	-0.008	0.934 <sup>ns</sup>

s= significant, ns= not significant

P value reached from Pearson correlation

## Discussion

Aim of the present study was to determine vitamin D status in diagnosed T2DM patients. Our study clearly observed that the frequency of subnormal vitamin D is high (69.6%) in T2DM patients. Among them 37.4% were deficient and 32.2% were insufficient, and only 30.4% of the study subjects were sufficient for vitamin D. Mean serum vitamin D was found to have 25.6±12.0 ng/dl with a range from 8.1 to 68.4 ng/dl. In a study by Bayani et al. found that Vit-D level was deficient in 77 patients (64.2%), insufficient in 30 (25.0%) and sufficient in 13 (10.3%) in T2DM patients. The mean vitamin D was 18.7±10.2 ng/dl which was lower than our study.<sup>21</sup> Lee et al, found that the mean concentration of vit D in their patients was 26.11±13.6 this is little bit higher than our findings in the diabetic patients.<sup>22</sup> Taheri E et al. showed that mean serum concentration of vit D in diabetic patients was 20.6±11.4 and in non- diabetic individuals was 22.22±16.03.<sup>23</sup> Mogahed MM study observed that 71% patients had vitamin D deficiency; only 9% had vitamin D insufficiency and 20% were having normal vitamin D level.<sup>24</sup> Rolim MC et al. reported the mean 25(OH)D level as 28.10±9.26 ng/mL. The overall prevalence of hypovitaminosis D was 62% (39.8% insufficient and 22.2% deficient).<sup>25</sup> Aljack HA et al. observed 161 (78.5%) had Vitamin D deficiency and 44 (21.5%) had Vitamin D sufficiency.<sup>26</sup> Laway BA et al. found 81% of newly diagnosed T2DM patients were D deficient or insufficient while around 67% of healthy control subjects also were either deficient or insufficient.<sup>27</sup> In another study by Daga RA et al. D deficiency was found in 97.5% of the newly diagnosed T2DM subjects.<sup>28</sup> A large proportion of patients previously diagnosed as T2DM taking anti-diabetic drugs also have been found to have subnormal levels of vitamin D. Palazhy et al. in their study found that the

frequency of D-deficient and D-insufficient T2DM patients were 71.4% and 15% respectively.<sup>16</sup> A Saudi Arabian study also found higher frequency of subnormal vitamin D in T2DM patients (76.6% deficient and 22.2% insufficient).<sup>29</sup> The mean serum 25(OH)D concentration in our study was 25.6±12.0 ng/dl (mean±SD), which is higher than findings of Laway et al. (18.81±15.18ng/ml, mean±SD) and Daga et al. (7.34±1.19ng/mL mean±SD).<sup>27,28</sup> In this study observed age, sex and residence were not statistically significant ( $p>0.05$ ) between two groups (Normal and subnormal). In a study by Mogahed MM et al. observed that vitamin D deficiency was maximam observed in the fifth decade (41–50 years) 22 (31%) patients, while the normal vitamin D level was maximally observed in the sixth decade (51–60 years), eight (40%) patients.<sup>24</sup> However, there was no statistically significant difference between different age groups ( $P=0.06$ ) which is similar to our study. Bellan et al. reported that 25(OH) D3 levels showed no seasonal variations, and 25 (OH) D3 concentrations were in the range of deficiency in 84.7% (N=444; F/M, 57.4/42.6%), insufficiency in 10.3% (N=54; F/M, 58.2/41.8%) and normalcy in 5% of patients (N=26; F/M, 64.0/46.0%). The distribution of vitamin D status was similar between genders.<sup>30</sup> Rolim et al. observed the mean age was 58.29 ± 10.34 years and the majority were women (72.2%) and non-white (89.8%). Hypovitaminosis D was more common among women (70.5 vs. 40%, female vs. male,  $p=0.01$ ).<sup>25</sup> The present study showed smoking, hypertension and obesity were not statistically significant ( $p>0.05$ ) between two groups. Rolim et al. reported Hypovitaminosis D was more common among obese (77.1 vs. 54.2%, obese vs. nonobese,  $p=0.02$ ), dyslipidemic (72.3 vs. 28%, dyslipidemic vs. non-dyslipidemic,  $p < 0.01$ ) and statin users (71% vs. 46.1%, users vs. non-users,  $p=0.01$ ).<sup>25</sup> Several studies in diabetic patients report an association between obesity and hypovitaminosis D.<sup>13</sup> Obesity varies between the sexes and between different races and is a recognized risk factor for vitamin D deficiency and type 2 diabetes.<sup>14-16</sup> Aljack et al. also reported BMI was significantly associated with Vitamin-D deficiency ( $P=0.004$ ).<sup>26</sup> Our study showed positive correlation ( $r=0.199$ ;  $p=0.033$ ) between HbA1c and vitamin-D with type 2 diabetic patients and negative correlation ( $r=-0.197$ ;  $p=0.035$ ) between BMI and vitamin-D with type 2 diabetic patients. Alam et al. showed that 25(OH) D level

had significant negative correlation with BMI, which is similar to our study. They also found significant positive correlation of 25(OH)D level and fasting plasma glucose, in our study there is significant positive correlation ( $r=0.199$ ;  $p=0.033$ ) between HbA1c and level of vitamin-D with type 2 diabetic patients.<sup>31</sup> Lagunova et al. had demonstrated an inverse relationship between 25(OH) D levels and BMI in 2126 subjects with metabolic syndrome or diabetes; those with high BMI had lower 25(OH)D levels.<sup>32</sup> Palazhy et al. and Daga et al. noticed no direct correlations between BMI and 25(OH)D level. Rolim et al.<sup>16,28</sup> reported significant inverse linear correlations with vitamin D levels: BMI ( $r=-0.20$ ,  $p=0.04$ ), HbA1c ( $r=-0.22$ ,  $p=0.03$ ), total cholesterol ( $r=-0.39$ ,  $p < 0.01$ ), LDL-c ( $r=-0.32$ ,  $p < 0.01$ ), triglycerides ( $r = -0.34$ ,  $p < 0.01$ ) and microalbuminuria ( $r=-0.23$ ,  $p =0.02$ ) Bellan et al.<sup>25</sup> observed positive association was seen between 25(OH)D3 and HDL-CHO levels ( $r=0.13$ ,  $p=0.002$ ). In addition to the previous, 25(OH) D3 concentrations were markedly correlated to PTH ( $r=-0.27$ ,  $p < 0.0001$ ) and HbA1c levels ( $r=0.091$ ,  $p=0.040$ ).<sup>30</sup> Aljack et al. reported significant positive correlation was found between Vitamin-D and age ( $r=0.355$ ;  $P=0.040$ ). In addition, Vitamin-D was negatively correlate with BMI ( $r=-0.502$ ;  $P=0.009$ ), duration of disease ( $r=-0.498$ ;  $P=0.003$ ), ACR ( $r=-0.384$ ;  $P=0.015$ ), and HbA1c ( $r=-0.327$ ;  $P=0.032$ ).<sup>26</sup>

### Limitations of the study

This study had several limitations. Sample size was not so large and no healthy control group was taken. Seasonal variation, extent of sunlight exposure and dietary vitamin D intake were also not quantified.

### Conclusion

A large portion of T2DM subjects in Bangladesh have subnormal vitamin D as revealed by our study. Increased age in years, high BMI and mean HbA1c were significant correlate with Vitamin D deficiency. However, wider scale studies are needed to properly understand the vitamin D status in T2DM in our country

### Reference

1. International Diabetes Federation. IDF Diabetes Atlas. 7th edn. Brussels, Belgium: International Diabetes Federation. 2015.

2. Holick MF. Sunlight, vitamin D and health: A D-lightful story. Oslo: The Norwegian Academy of Science and Letters. Espen Bjertness. 2008.
3. Grimnes G, Emaus N, Joakimsen RM, et al. Baseline serum 25-hydroxyvitamin D concentrations in the Tromso Study 1994-95 and risk of developing type 2 diabetes mellitus during 11 years of follow-up. *Diabet Med.* 2010;27: 1107-15.
4. Anderson JL, May HT, Horne BD, et al. Relation of vitamin D deficiency to cardiovascular risk factors, disease status, and incident events in a general healthcare population. *Am J Cardiol.* 2010; 106: 963-8.
5. Mitri J, Muraru MD, Pittas AG. Vitamin D and type 2 diabetes: a systematic review. *EJCN.* 2011;65: 1005-15.
6. Lind L, Hanni A, Lithell H, Hvarfner A, Sorensen OH, Ljunghall S. Vitamin D is related to blood pressure and other cardiovascular risk factors in middle-aged men. *Am J Hypertens.* 1995;8: 894-901.
7. Scragg R, Jackson R, Holdaway IM, Lim T, Beaglehole R. Myocardial infarction is inversely associated with plasma 25- hydroxyvitamin D3 levels: a community-based study. *Int J Epidemiol.* 1990;19: 559-63.
8. Green RT, Gambhir KK, Nunlee-Bland G, Odonkor WA, Ganta VA. Maintenance of long-term adequate levels of vitamin D lowers HbA1c in African American patients with type 2 diabetes. *Ethn Dis.* 2014;24: 335-41.
9. Anyanwu AC, Fasanmade OA, Odeniyi IA, Iwuala S, Coker HB, Ohwovoriole AE. Effect of Vitamin D supplementation on glycemic control in Type 2 diabetes subjects in Lagos, Nigeria. *Indian J Endocr Metab.* 2016;20: 189-94.
10. Holick MF. Vitamin D deficiency. *N Engl J Med.* 2007;357: 266-81.
11. Mitchell DM, Henao MP, Finkelstein JS, Burnett-Bowie SM. Prevalence and Predictors of Vitamin D Deficiency in Healthy Adults. *Endocr Pract.* 2012;18: 914-23.
12. Goswami R, Gupta N, Goswami D, Marwaha RK, Tandon N, Kochupillai N. Prevalence and significance of low 25- hydroxyvitamin D concentrations in healthy subjects in Delhi. *Am J Clin Nutr.* 2000;72: 472-5.



13. Harinarayan CV, Ramalakshmi T, Venkata PV. High prevalence of low dietary calcium and low vitamin D status in healthy south Indians. *Asia Pac J Clin Nutr*. 2000;72: 690-3.
14. Ritu G, Gupta A. Vitamin D deficiency in India: prevalence, causalities and interventions. *Nutrients*. 2014;6: 729-75.
15. Kumar A, Haria JM. Vitamin D status and type 2 diabetes mellitus in Indians: a case-control study. *Int J of Scientific Study*. 2014;2: 104-7.
16. Palazhy S, Viswanathan V, Muruganathan A. Prevalence of 25-hydroxy vitamin D deficiency among type 2 diabetic subjects of South India. *Int J Diabetes Dev Ctries*. 2017;37: 69-73.
17. Dutta D, Maisnam I, Shrivastava A, et al. Serum vitamin-D predicts insulin resistance in individuals with pre-diabetes. *Indian J Med Res*. 2013;138: 853-60.
18. American Diabetes Association. Classification and diagnosis of diabetes. Sec. 2. In *Standards of Medical Care in Diabetes 2017*. *Diabetes Care*. 2017;40(Suppl.1):S11-S24.
19. Holick MF, Binkley NC, Bischoff-Ferrari HA, et al. Evaluation, treatment and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. *Clin Endocrinol Metab*. 2011;96: 1911-20.
20. Misra A, Chowbey P, Makkar BM, et al. Consensus Statement for Diagnosis of Obesity, Abdominal Obesity and the Metabolic Syndrome for Asian Indians and Recommendations for Physical Activity, Medical and Surgical Management. *JAPI*. 2009;57: 163-70.
21. Bayani MA, Akbari R, Banasaz B, Saeedi F. Status of Vitamin-D in diabetic patients. *Caspian journal of internal medicine*. 2014;5(1): 40-2.
22. Lee JI, Oh SJ, Ha WC, et al. Serum 25-hydroxyvitamin D concentration and arterial stiffness among type 2 diabetes. *Diabetes Res Clin Pract* 2012; 95: 42-7.
23. Taheri E, Saedisomeolia A, Jalali M, Qorbani M, Madani Civi M. The relationship between serum 25-Hydroxy vitamin D concentration and obesity in type 2 diabetic patients and healthy subjects. *Diabetes metab Disord* 2012;11: 16.
24. Mogahed MM. Vitamin D status in patients with type-2 diabetes mellitus in Riyadh City, Saudi Arabia. *Kasr Al Ainy Medical Journal*. 2018;24(1): 19-25.
25. Rolim MC, Santos BM, Conceição G, Rocha PN. Relationship between vitamin D status, glycemic control and cardiovascular risk factors in Brazilians with type 2 diabetes mellitus. *Diabetology & metabolic syndrome*. 2016;8(1): 1-7.
26. Aljack HA, Abdalla MK, Idris OF, Ismail AM. Vitamin D deficiency increases risk of nephropathy and cardiovascular diseases in Type 2 diabetes mellitus patients. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences*. 2019;24: 47.
27. Laway BA, Kotwal SK, Shah ZA. Pattern of hydroxyl vitamin D status in North Indian people with newly detected type 2 diabetes: A prospective case control study. *Indian J Endocr Metab*. 2014;18: 726-30.
28. Daga RA, Laway BA, Shah ZA, Mir SA, Kotwal SK, Zargar AH. High prevalence of vitamin D deficiency among newly diagnosed youth-onset diabetes mellitus in north India. *Arq Bras Endocrinol Metab*. 2012;56: 423-8.
29. Alhumaidi M, Agha A, Dewish M. Vitamin D Deficiency in Patients with Type-2 Diabetes Mellitus in Southern Region of Saudi Arabia. *MAEDICA*. 2013;8: 231-6.
30. Bellan M, Guzzaloni G, Rinaldi M, et al. Altered glucose metabolism rather than naive type 2 diabetes mellitus (T2DM) is related to vitamin D status in severe obesity. *Cardiovascular diabetology*. 2014;13(1): 1.
31. Alam MS, Kamrul-Hasan M, Kalam ST, et al. Vitamin D Status in Newly Diagnosed Type 2 Diabetes Patients Attending a Tertiary Hospital of Bangladesh. *Mymensingh Med J*. 2018; 27 (2): 362-8.
32. Lagunova Z, Porojnicu AC, Lindberg F, Hexeberg S, Moan J. The dependency of vitamin D status on body mass index, gender, age and season. *Anticancer Res*. 2009;29: 3713-20.

# Army Medical College Cumilla Journal

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Corresponding author

As principal investigator Dr

had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design .....

Acquisition of data .....

Analysis and interpretation of data .....

Drafting of the manuscript.....

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