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Review Article

Characterizing Corona Virus Disease 2019 (COVID 19)

Tarafdar M A

Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly transmissible and pathogenic coronavirus that emerged in late 2019 and has caused a pandemic of acute respiratory disease, 'coronavirus disease 2019' (COVID-19), which threatens human health and public safety. Populations with comorbidities, such as cerebrovascular and cardiovascular diseases, hypertension, COPD, and renal disease are most at risk of dying from COVID-19. It is also evident that comorbidities have definite impact on the severity of COVID-19. The varied clinical manifestations of COVID-19 with its rapid human-to-human transmission throughout the world resulted in high rates of mortality rate in a short time. The epidemiology and the characteristics of COVID-19 patients in Bangladesh need to have a proper insight into the natural history, patho-physiology and patterns in progression of the disease.

Keywords: SARS, COVID-19, COPD

Introduction

Currently, the world is facing a serious threat of public health due to severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) causing 'corona virus disease 2019' (COVID-19), a highly infectious transmissible disease, which was declared a pandemic by the World Health Organization (WHO) on March 11, 2020.[1]

31st December 2019 Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province. A novel coronavirus was eventually identified, subsequently on 4th January 2020 WHO reported on social media that there was a cluster of pneumonia cases with no deaths in Wuhan, Hubei province. On 5th January 2020, WHO published the first Disease Outbreak News on the new virus and on 12th January 2020, China publicly shared the genetic sequence of COVID-19.[2]

The first confirmed case of coronavirus disease 2019 (COVID-19) in the US was reported from Washington State on January 31, 2020.[3] Bangladesh had its first three confirmed cases of COVID 19 on March 8, 2020; of these two returned from Italy and the third was a member of one of the traveler.[4]

Community participation is required for effective pandemic management and prevention of community transmission. Although COVID-19 has unique character, clinical manifestation varied from country to country. Despite of preventive measures taken by the governments of high-income countries, a number of European countries and the USA have been seriously hit by COVID-19 pandemic. However, countries such as Bangladesh and Egypt and some low and middle-income countries reported fewer identified cases.[5]

Correspondence to:
Prof. Dr. Monowar Ahmad Tarafdar
Professor and Head, Department of Community Medicine
ZH Sikder Women's Medical College, Dhaka.
Email: babla762@yahoo.com

The COVID 19

Some individuals who are infected do not develop any symptoms at all, and about 80% of positive cases recover from the disease without any treatment.[6] The varied clinical manifestations of COVID-19 with its rapid human to human transmission throughout the world resulted in high mortality rate in a short time.[7]

The Centers for Disease Control and Prevention (CDC, 2020) describes the characteristics of people who are at risk of suffering severe illness from COVID-19. The characteristics are people aged over 65 years, people living in a long-term care facility, people with asthma, diabetes, kidney disease, liver disease, or heart disease, people who have immunodeficiency as a result of disease and people who have unhealthy behavior, such as smoking.[8]

It is observed in several studies that moderate COVID-19 was more prevalent than severe and critical COVID-19 in patients with one or more comorbidities.[9,10] COVID-19 patients with co morbidities had worse clinical outcomes as compared with those without any comorbidity. The higher the number of comorbidities, the greater was the risk of serious adverse outcomes.[11] More than one third of patients had diverse comorbidities including DM, HTN, COPD and CHD. Mortality outcome was significantly associated with the elderly and having comorbidity. COPD and elderly were significantly associated with the not-cured outcome of morbidity.[12]

COVID-19 has a wide range of clinical presentation, from asymptomatic infection to mild (40%), moderate (40%) and severe disease (15%) that requires oxygen support and only 5% are critical cases.[13] The majority of critical cases occur in older (≥60 years) or co morbid individuals.[14] In a study it was observed that adult patients especially the economically productive age group were mostly affected followed by elderly population.[15] Older patients, especially those 65 years old and above with comorbidities have an

increased admission rate into the intensive care unit (ICU) and mortality from the COVID-19 disease.[16] In addition to age, biological sex and ethnicity have also been implicated in COVID-19 outcomes.[17] For both patients discharged alive and those who died, the percentage of patients who were treated in the ICU or received invasive mechanical ventilation was increased for the 18-to-65 age group compared with the older-than-65 years age group.[18] In studies individual's age was found to have significant association with symptomatic cases.

Higher proportions of asymptomatic cases were found in the young age.[19] It was found that patients with age ≥50 years confirmed with SARS-CoV-2 infection were associated with 15.4-folds significantly increased risk of mortality as compared to patients with age <50 years.[20] Evidence from the global outbreak has demonstrated that individuals with pre-existing comorbidities are at a much greater risk of dying from COVID-19.[21]

The incubation period of COVID-19 based on the experience in China, has been estimated to be a median of 5.1 days. The incubation period for COVID-19 ranged 2 days to 14 days and it is different for different age groups; It is estimated about 95% will show symptoms within 14 days.[22] Prognosis of COVID 19 for people having underlying morbidity of any age, such as hypertension and diabetes shown to be bad.[23]

Findings from study by Irin Hossain et al suggest that patients having comorbidities had greater severity due to COVID 19 and a greater number of comorbidities correlated with greater disease severity of COVID-19. It is advisable for better protection to be given to the patients with COIVD-19 who had comorbidities upon confirmation of the diagnosis.[24]

COVID 19 patients with acute respiratory distress syndrome and respiratory failure may be linked to a prothrombotic coagulopathy and autopsy revealed dispersed microthrombi in the pulmonary vasculature, proving an occlusive etiology of respiratory failure.[25]

Prevalent cardiovascular disease is associated with higher mortality and severity of COVID-19; the association between hypertension and COVID-19 mortality and severity could be partly explained by the increased age and higher prevalence of cardiovascular disease.[26]

Current evidence from China and the US suggests that comorbidities such as hypertension, diabetes, obesity, chronic obstructive pulmonary disease (COPD) and cerebrovascular disease increase the risk of severity and death from COVID-19.[27,28] Among laboratory-confirmed cases of Covid-19, patients with any comorbidity yielded poorer clinical outcomes than those without. A greater number of comorbidities also correlated with poorer clinical outcomes. A thorough assessment of comorbidities may help establish risk stratification of patients with Covid-19 upon hospital admission.[29] The highest odds of fatality risk were detected in patients with COVID-19, CVD and diabetes. The risk increased many folds when CVD and diabetes coexisted in patients.[30] Some published work found that COVID-19 has the potential to trigger the onset of different types of diabetes. The prevalence of diabetes in patients with COVID-19 were 9.8% in Wuhan, 9.7% in China, 8.9% in Italy.[31] The immune system plays a vital role during COVID-19, and the degree of immune dysfunction correlates with disease severity.[32] As lymphopenia is regarded as a major risk factor for developing severe COVID-19, individuals having autoimmune condition may be perceived as high risk.[33]

Conclusion and recommendations

It is recommended that community participation as well as empowerment needed and the service delivery should be emphatic to the high risk group having comorbidities and that identification through screening be done to identify undiagnosed cases. Individual with comorbidities should be encouraged to use all recommended protectivemeasures.[34]

Government should initiate appropriate far-reaching program of health education focusing on knowledge and preventive behaviors towards COVID-19 through community participation. The strategies to combat COVID-19 require multidisciplinary as well as individual involvement to control and prevent the communicable disease outbreak in particular COVID 19, for which health education is essential.[35]

The epidemiology and the characteristics of COVID-19 patients in Bangladesh need to have a proper insight into the natural history, patho-physiology and patterns in progression of the disease. It is essential to examine these aspects and factors related to the outcomes of COVID-19 to implement appropriate measures to prevent and treat.

References

1. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic.2020 Mar 19;91(1):157-160. DOI: 10.23750/abm.v91i1.9397
2. WHO. Archived: WHO Timeline - COVID-19, 27 April 2020. Available from: https://www.who.int/news/item/27-04-2020-who-timeline---covid-19
3. Richardson S et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area; JAMA. 2020;323(20):2052-2059. doi:10.1001/jama.2020.6775
4. M T Islam, Talukder A K, Siddiqui M N, and Islam T. Tackling the COVID-19 pandemic: The Bangladesh perspective; J Public Health Res. 2020 Oct 14; 9(4): 1794. Available from: doi: 10.4081/jphr.2020.1794
5. Ali M, Knowledge, attitude, practice and fear of COVID-19: A cross-cultural study. i: https://doi.org/10.1101/2020.05.26.20113233

6. WHO. Q&A on coronaviruses (COVID-19). World Health Organization. 2020., Available from URL: https://www.who.int/news-room/q-a-detail/q-a-coronaviruses.
7. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Bio Medica: AteneiParmensis*. 2020;91(1):157.
8. Mohsin F M. Association between Smoking and COVID-19 Severity: Evidence from Bangladesh. Journal of Multidisciplinary Healthcare 2021:14 1923-1933
9. Hasan M J, Anam A M, Huq S M R and Rabbani R. Impact of Comorbidities on Clinical Outcome of Patients with COVID-19: Evidence from a Single-center in Bangladesh; Health Scope. 2021 February; 10(1):e109268. doi: 10.5812/jhealthscope.109268.
10. Paul N, Azad NA , Parveen R , Saha TK, Hoque M, Deb SR, Haque A, Barman TK, Matin MHA, Bhuyian RZ, Afrin S, Yasmin R. Clinical profile of first 100 cases of COVID-19 in a COVID-dedicated hospital of Bangladesh, BIRDEM Med J 2020; 10, COVID Supplement: 18-22.
11. Ye C, Zhang S, Zhang X, Cai H, Gu J, Lian J, et al. Impact of comorbidities on patients with COVID-19: A large retrospective study in Zhejiang, China; https://doi.org/10.1002/jmv.26183
12. Islam MZ et al (2020). Risk factors associated with morbidity and mortality outcomes of COVID-19 patients on the 28th day of the disease course: a retrospective cohort study in Bangladesh. Epidemiology and Infection 148, e263, 1-8. Available from: https://doi.org/10.1017/S0950268820002630
13. World Health Organization (2020) Clinical Management of COVID-19: Interim Guidance. 27 May 2020. World Health Organization. https://apps.who.int/iris/handle/10665/332196.
14. Day M. Covid-19: four fifths of cases are asymptomatic, China figures indicate. *BMJ*. (2020) 369:m1375. doi: 10.1136/bmj.m1375
15. Bodiuzzaman M M. and Hossain M I. Presentation of COVID-19 Disease and the Impact of Patient's Comorbidities on Its Hospital Outcome: An Observational Study in a COVID-19 Dedicated Hospital. European Journal of Medical and Health Sciences. l3(2): 138-142. DOI: http://dx.doi.org/10.24018/ejmed.2021.3.2.788
16. Adekunle Sanyaolu. Comorbidity and its Impact on Patients with COVID-19, SN Comprehensive Clinical Medicine. Available from: URL: https://doi.org/10.1007/s42399-020-00363-4
17. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. (2020) 395:507-13. doi: 10.1016/S0140-6736(20)30211-7
18. Richardson S, Hirsch JS, Narasimhan M, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. *JAMA*. 2020;323(20):2052-2059. doi:10.1001/jama.2020.6775
19. Mannan A, et al. A multi-centre, cross-sectional study on coronavirus disease 2019 in Bangladesh: clinical epidemiology and short-term outcomes in recovered individuals. New Microbes and New Infections 40(10223):100838.DOI: 10.1016/j.nmni.2021.100838
20. Biswas M, Rahaman S, Biswas TK, Haque Z and Ibrahim B. Association of Sex, Age, and Comorbidities with Mortality in COVID-19 Patients: A Systematic Review and Meta-Analysis, Intervirology 2021; 64 (1):36-47. Available from:URL: https://doi.org/10.1159/000512592
21. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, et al. Prevalence of comorbidities in the novel Wuhan coronavirus (COVID-19) infection: a systematic review and meta-analysis. *Int J Infect Dis.* (2020) 94:91-5. doi: 10.1016/j.ijid.2020.03.017
22. CDC. Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19). Available from: URL: https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html
23. Singh AK, Gupta R, Ghosh A, Misra A. Diabetes in COVID-19: prevalence, pathophysiology, prognosis, and practical considerations. Diabetes MetabSyndr, Jul-Aug 2020;14(4):303-310. doi: 10.1016/j.dsx.2020.04.004. Epub 2020 Apr 9.
24. Hossain I et al. Co morbidity and it's Impact on COVID-19 A ected Patients in COVID-19 Dedicated Hospital of Bangladesh; Bangladesh Med J. 2020 Jan; 49(1)
25. Wang J, Hajizadeh N, Moore EE, McIntyre RC, Moore PK, et al. Tissue plasminogen activator (tPA) treatment for COVID-19 associated acute respiratory distress syndrome (ARDS): a case series. J ThrombHaemost. 2020. Available from: URL: https://doi.org/10.1111/jth.14828
26. Sisnieguez CEL, Espeche WG, Salazar MR. Arterial hypertension and the risk of severity and mortality of COVID-19; European Respiratory Journal 2020; Available from: URL: DOI: 10.1183/13993003.01148-2020
27. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM, et al. Comorbidity and its impact on 1590 patients with COVID-19 in China: a nationwide analysis.

EurRespir J. 2020 May 14; 55(5):2000547. Available from: https://doi.org/10.1183/13993003.00547-2020

28. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, DavidsonKW et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. JAMA. 2020; 323(20):2052-2059. Available from: https://doi.org/ 10.1001/jama.2020.6775

29. Guan W-jie, Liang W-hua, Zhao Y, *et al*. Comorbidity and its impact on 1590 patients with Covid-19 in China: A Nationwide Analysis. *EurRespir J* 2020; https://doi.org/10.1183/13993003.00547-2020.

30. Sharif N. Prevalence and impact of diabetes and cardiovascular disease on clinical outcome among patients with COVID-19 in Bangladesh; Diabetes & Metabolic Syndrome: Clinical Research & Reviews 15 (2021) 1009e1016. Available from: DOI: 10.1016/j.dsx.2021.05.005

31. Apicella M, Campopiano MC, Mantuano M, Mazoni L, Coppelli A, Del Prato S. COVID-19 in people with diabetes: understanding the reasons for worse outcomes. Lancet Diabetes Endocrinol 2020;8: 782e92. Available from: https://doi.org/ 10.1016/S2213-8587(20)30238-2.

32. Tan L, Wang Q, Zhang D, Ding J, Huang Q, Tang Y-QQ, et al. Lymphopenia predicts disease severity of COVID-19: a descriptive and predictive study. *Signal Transduct Target Ther.* (2020) 5:33. doi: 10.1038/s41392-020-0148-4

33. Callender L A, Curran M, Bates S M, Mairesse M, Weigandt J and Betts C J. The Impact of Pre-existing Comorbidities and Therapeutic Interventions on COVID-19; Front. Immunol., 11 August 2020. Available from: https://doi.org/10.3389/fimmu. 2020.01991

34. World Health Organization. Coronavirus disease (COVID-19) advice for the public [Internet]. 2020. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

35. Hosen I et al. Knowledge and preventive behaviors regarding COVID-19 in Bangladesh: A nationwide distribution, PLOS ONE, May 3, 2021. Available from: https://doi.org/10.1371/journal.pone.0251151