

Leading Article

The Higher Fatality Rate of Children from COVID-19 in Bangladesh Is it Ethnicity or Malnutrition or Else?

CHOWDHURY YAKUB JAMAL¹, SHAHANA A RAHMAN²

Despite Prof. Matteo Bassetti's observation that "the CORONA VIRUS has weakened and would die down on its own and further vaccine will not be needed"¹, COVID-19 which was started in Wuhan, China in December 2019 is raging like a bull throughout the Globe. Since it was declared a Pandemic on 11th March 2020, It has spread into more than 200 countries throughout the world with its killing spree and now devastating USA, Latin America, The south Asia and South Africa with its might. Like all other countries the small but densely populated Bangladesh is affected by its fangs in all sphere, be it education, health care, finance, banking and what not. Since last six months, physicians and researchers are observing and giving their views and we are learning, because still there are many things to be known. Sometimes the occurrences are quite baffling.

It is being shown that children are being infected with their adult counterpart in all the countries. The good thing is that the virus has fewer predilections for children/ less than 20 years. The reasons they have postulated, less expression of ACE-2 receptors in children, are: also the children have lesser contacts and they go less in public places.^{2,3} However still the children are susceptible from East to West and they are having fatality which is less in number.

If we consider United States with most infections and most mortality, among the first 150,000 confirmed cases of the country, 1.7% children were affected below 18 yrs of age whereas children accounts for

22% of whole population. A US study by David and Jay had shown that 48 children were admitted in 14 ICUs between mid March and early April 2020.⁴ Over 80% had underlying medical conditions. The most common was immunosuppression /cancer, followed by obesity and diabetes. Among the 2 patients died, one was 17 years and one 12 years old. In South Korea children younger than 9 years accounted for 1% of lab confirmed cases and children between 10 and 19 accounted for 5.2% of cases. No fatality has been reported.⁵

A study showing Governments Websites from countries with minimum 1000 cases with adults and children in April 2020, were assessed to find the number of cases confirmed in children, the age range, number leading to hospitalization, ICU admission or deaths. Twenty-three of the 70 countries had confirmed 424978 cases where 8113 occurred in children (1.9%), ICU admission was 2.2% cases. Death was reported in 15 cases.⁶

Data from initial studies in China /WHO joint commission of February 28, 2020 shows that in 5524 confirmed cases death rate in 0 -9 years 0% and in 10-19 years 0.2% only.⁷ A news to the editor in the New England Journal of Medicine from a paediatric emergency in Italy on May 1, 2020 says that in a cohort of 100 children below 18 years (1% of total number of COVID patients), 11% were hospitalized but nobody died.⁸

In Maharashtra, the hardest hit state in India with COVID-19 has 0.1% mortality below 10 years. There have been reports of 10 fatalities in Maharashtra state. The youngest was a 13 month old boy from Pune with malnutrition and megaloblastic anaemia. Of the 10 mortality four were below 10 years, rest six were between 11-18 years.⁹

Relatively milder infection occurs in children in contrast with severe forms reported in adults, but there is a global concern of an association between

1. Professor, Paediatric Haematology-Oncology & Dean, Faculty of Paediatrics, Bangabandhu Sheikh Mujib Medical University, Dhaka.

2. Professor, Paediatrics & Pro-VC (Academy) Bangabandhu Sheikh Mujib Medical University, Dhaka.

Correspondence: Dr. Chowdhury Yakub Jamal, Professor, Paediatric Haematology-Oncology & Dean, Faculty of Paediatrics, Bangabandhu Sheikh Mujib Medical University. Contact no: 01552449302, Email: chowdhuryyakub@yahoo.com

the SARS COV-2 disease and manifestations of vasculitis like features simulating Kawasaki Disease (KD), KD Shock syndrome or multisystem inflammatory syndrome in children (MIS-C). This vasculitis like manifestations could appear during the infection or few weeks later.¹⁰ Verdoni L et al. from Italy reported a strong association between the outbreak of Kawasaki like diseases and the Covid-19 epidemic.¹¹ They found a 30-fold increased incidence of these diseases. These children also showed a severe and higher rate of cardiac involvement and features of Macrophage Activation Syndrome (MAS). The researchers also apprehended that a similar outbreak of Kawasaki like diseases is also expected in other countries of the world affected by Covid-19 pandemic. National Health system of United Kingdom and their pediatric intensive care society also issued an alert regarding increased frequency of pediatric multisystem inflammatory syndrome associated with Covid-19.¹² In many of these cases RT PCR was found negative. It is postulated that Covid-19 infection in recent past can trigger an immune response simulating KD. Multisystem inflammatory syndrome with features of atypical Kawasaki disease is also reported from our neighboring country India.¹³

Interestingly as per IEDCR Bangladesh, epidemiological study confirmed cases of Covid-19 were by age 1-10 years 3% and 11-20 years 7% and fatality by age 1-10 years 0.8% and 11-20 years 1.5% respectively.¹⁴ Dhaka Medical College Hospital statistics, where there is a corona unit for children, from 100 confirmed cases 5 patients died, of whom 3 had cancer, one congenital heart disease, one cleft palate a 25 day old child, making it 5%¹⁵ (personal communication).

Considering the data, it appears to us, that susceptibility of children in Bangladesh compared to other countries is more and the mortality is also far more. This is quite an interesting phenomenon which is to be taken care of. Fatality in Bangladeshi children population, what we have seen, does not match or fit other countries. No publication so far from any country regarding the causes of different child mortality from different country is reported, though ethnicity can be a consideration. But it seems that

the fatality in South Asian people (Bangladesh, India, Pakistan) are even more in UK.

Should we consider malnutrition or vitamin D deficiency? We still don't know.

If we compare population strata of our country with developing countries, children make up around 40 percent of the population in Bangladesh,¹⁶ which is much more higher than developed countries, where elderly population is much more in number. Malnutrition has got an established association with decreased immunity and increased infection,¹⁷ and we know that malnutrition is still quite common in our children population.¹⁸

The importance of vitamin D deficiency on the immune system is a well known phenomenon. It is reported that in addition to influencing skeletal health, diabetes mellitus, cancers, auto immune diseases, cardio-vascular diseases and others, vitamin D deficiency is also responsible for increased susceptibility to infection.¹⁹ Several studies were carried out to see the association of vitamin D levels with increased rate of infection. One large study including 19,000 subjects reported that individuals with lower vitamin D levels (<30mg/ml) were more likely to have upper respiratory infection than those with sufficient levels even after adjusting the confounding variables like age, race, gender, body mass index, seasonal variation etc.²⁰

During this Covid-19 pandemic, a research team led by North Western University (NU) in the US reported that severe vitamin D deficiency are twice as likely to experience severe Covid infection including complications and death.²¹ It is to be noted here that, prevalence of vitamin D deficiency among Bangladeshi children are very high.²²⁻²⁴

We still don't know why children population in Bangladesh is more vulnerable to Covid-19 infection including severity and mortality. Our personal experience in Bangabandhu Sheikh Mujib Medical University shows that; among the patients attending in the fever clinic, about 6% of confirmed COVID cases were children below 18 years. Atypical Kawasaki disease (KD) and Multi system inflammatory syndrome in children (MIS-C) were also postulated in quite number of cases though this was not the season of KD. Similar to published reports, some of them were RT-PCR negative.

In conclusion, the possible factors discussed above including population strata, malnutrition and vitamin D deficiency should be seriously considered and researches should also be carried out to explore these issues.

References:

1. The Telegraph, 20 June 2020.
2. Lee P Huyl, Chen PY, Huang YC, Hsueh PR. Are children less susceptible to COVID-19? *J Microbiol Immunol Infection* 2020; 3: 371-72
3. Gotzinger F, Garcia B S, Julian A N, Lanaspas M, Lancella L, Carducci FC, et al. COVID-19 in children and adolescents in Europe: A Multinational, Multicentre Cohort Study. *www.the lancet.com/child-adolescent* published online June 25,2020 [http://doi.org/10.1016/s2352-4642\(20\)30177-2](http://doi.org/10.1016/s2352-4642(20)30177-2).
4. David G, Hefner JE. COVID-19: Severe Illness in Children/Excess Mortality in NYC/Vaccine R & D. *N Eng J Med* 2020; May 11.
5. Choi SH, Kong JM, Kim HW, Kong JM, Kim DH, Cho EY. Epidemiological and Clinical Features of Corona virus disease 2019 in Children. *Clinical and Experimental Pediatrics* 2020; April 6.
6. Forbes MB, Mehta K, Kumar K, Jieliu Lu, Nicole LS, Samson M. COVID-19 Infection in Children: Estimating Pediatric Morbidity and Mortality. *med RX iv, BMJ* 2020; doi:<https://doi.org/10.1101/2020.05.05.2009175>.
7. World Health Organisation Report of the Coronavirus Disease 2019(COVID-19) WHO-China Joint Mission on Covid 19, Geneva.
8. Parri N, Matteo L, Buonsenso, D. Children with COVID-19 in Paediatric Emergency Departments in Italy. *N Engl J Med* 2020; 383 :187-90.
9. "The Hindu" June 2020, India.
10. Toubiana J, Poirault C, Corsia A, Bajolle F, Fourgeaud J, Angoulvant F, et al. Kawasaki-Line Multisystem Inflammatory Syndrome in Children During the COVID-19 Pandemic in Paris, France: Prospective Observational Study. *BMJ*2020; 369: m 2094 / doi: 10.1136
11. Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M, et al. An Outbreak of Severe Kawasaki-Line Disease at the Italian Epi-centre of the SARS-CoV-2 epidemic: An Observational Cohort Study. *www.thelancet.com* published online May 13, 2020
12. National Health Service and Paediatric Intensive Care Society, UK. Paediatric Inflammatory Multi system Syndrome- temporarily associated with SARS-CoV-2 (PIMS-TS): Critical Care guidance. PIMS-TS Rapid Guidance, v4, 14 May 2020.
13. Rauf A, Vijayan A, John S T, Krishan R, Latheef A. Multisystem Inflammatory Syndrome with Feature of Atypical Kawasaki Disease During COVID-19 Pandemic. *Indian J Pediatr* 2020; <http://doi.org/10.1007/s12098-020-03357-1>.
14. Covid-19 demographics. Bangladesh IEDCR 24 June, 2020
15. Personal communication. Prof. Sayeda Anwer, Head of the Department, Dhaka Medical College, Dhaka. June, 2020.
16. Children in Bangladesh, UNICEF is working with children across Bangladesh as they are the future agents of a growing nation. UNICEF for Every Child, Bangladesh. 2020.
17. Barry W. Ritz, Elizabeth M. Gardner. Malnutrition and Energy Restriction Differentially Affect Viral Immunity. *The Journal of Nutrition* 2006;136 :1141-44. <http://doi.org/10.1039/jn/136.5.1141>
18. Shaha UR, Chattapadhyay A, Richardus JH. Trends, Prevalence and Determinants of Childhood Chronic Under nutrition in Regional Divisions of Bangladesh: Evidence from Demographic Health Surveys, 2011 and 2014. *PLoS ONE* 2019; 14(8):e0220062. <http://doi.org/10.1371/journal.pone.0220062>
19. van Etten E, Stoffels K, Gysemans C, Mathieu C, Overbergh L. Regulation of Vitamin D Homeostasis: Implications for the Immune System. *Nutr Rev* 2008; 66(10 Suppl 2):S125–34. doi: 10.1111/j.1753-4887.2008.00096.
20. Ginde AA, Mansbach JM, Camargo CA Jr. Association between serum 25-hydroxyvitamin D level and upper respiratory tract infection in the Third National Health and Nutrition Examination Survey. *Arch Intern Med* 2009; 169:384–90.
21. Northwestern University (NU) Research Team, US May, 2020.
22. Zaman S, Hawlader M DH, Biswas A, Hasan M, Jahan M, Ahsan GU. High Prevalence of Vitamin D Deficiency among Bangladeshi Children: An Emerging Public Health Problem. *Health* 2017; 9;1680-88.
23. Dey M, Dey S C. Calcium and Vitamin D Deficiency Situation in Bangladesh: A Review. *Int J Res Rev* 2016; 3: 58-64.
24. Ahmed S, Chowdhury S K, Hossain I A, Yasmin R, Haque M M, Faruquee M H, et al. Status of Serum Vitamin D among Bangladeshi Children: Urban and Rural Settings. *Acta Scientific Paediatrics* 2019; 2.8: 03-07.