International Journal of Scientific Reports
Bashar MA et al. Int J Sci Rep. 2021 Oct;7(10):514-516
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164
DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20213701

Review Article

Are children and young people more susceptible to the newer strains of SARS-CoV-2 than earlier ones? Current evidences

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Received: 26 June 2021
Revised: 03 August 2021
Accepted: 01 September 2021

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ABSTRACT

The clinical impact of the new SARS-CoV-2 lineage B.1.1.7 on children and young people (aged 18 years or younger) regarding acute respiratory COVID-19 is yet to be fully defined. Some media reports of increases in admissions to hospital and more serious illnesses in children and young people have resulted in Public chaos and panic and implicated the B.1.1.7 variant as a cause of more pathogenic infection within this group. The aim of the study was to present the currently available evidence of increase susceptibility of the children and young people COVID-19 towards the B.1.1.7 strain of SARS-CoV-2.

Keywords: SARS-CoV-2, B.1.1.7, COVID-19, Susceptibility, Media

INTRODUCTION

According to the Centres for Disease Control and Prevention (CDC), it has been reported that children are less susceptible to develop severe manifestations of COVID-19; however, they can be infected with the virus, get sick from COVID-19, and spread the virus to others.[1] The majority of the children infected with COVID-19 have been reported to have mild or no symptoms.[1] However, with the emergence of new variants of SARS-CoV-2 particularly the B.1.1.7 variant, concerns have been raised regarding the susceptibility of the infection from these new variants among the paediatric population.

CURRENT EVIDENCE

According to the CDC, there are currently five variants of concerns (VOCs) in the United States, including B.1.1.7 (UK variant), B.1.351 (South African variant), P.1 (initially detected in Brazil), and B.1.427 and B.1.429 (both of which were first identified in California, US).[2] Studies have also shown that these variants, including 501Y.V1 (B.1.1.7) in UK, P.1 (501Y.V3) in Brazil, and 501Y.V2 (B.1.351) in South Africa, contribute to increased transmission of COVID-19.

According to the report by Davies et al the UK variant has been estimated to be more transmissible than the precursor lineage but has no clear evidence for a change in disease severity; however, the greater transmission will lead to higher incidence and more hospital admissions.[3]

The clinical impact of the new SARS-CoV-2 lineage B.1.1.7 on children and young adults (under the age of 18 years) with acute respiratory COVID-19 is yet to be determined. Also, it has been hypothesized in the few reports that the paediatric population might be more susceptible to infections with VOCs as compared to the original strains of SARS-CoV-2; however, till date, no such evidence has come up. Media reports of increases in hospital admissions and more serious illnesses in children and young people have caused public chaos and panic, and

the latest variants, especially the B.1.1.7 variant, have been implicated in causing a more pathogenic infection in this population.

However, recent data show that B.1.1.7 has not changed the paediatric hospitalization rate and that severe COVID-19 remains rare among the kids. No significant differences were found with respect to age, the proportion of patients with comorbidities, the proportion of patients from Black, Asian, and minority ethnic background, or deprivation score between the groups representing first and second waves.[4] There was also no evidence of more severe disease in children and adolescents during the second wave of COVID-19, implying that the infection with the B.1.1.7 variant might have a similar clinical course to the infection with the original strains.[4]

DISCUSSION

The novel SARS-CoV-2, which causes the disease called COVID-19, spread rapidly across the globe causing major devastations in life and economy of the countries. A striking and consistent observation across all the countries affected by the COVID-19 pandemic was the difference in severity of COVID-19 in different ages: severity, the need for hospitalization and mortality rise steeply with older age while severe disease and deaths were relatively rare in children and young adults.[5-7] Most children infected with SARS-CoV-2 are asymptomatic or have mild symptoms, most commonly fever, cough, pharyngitis, gastrointestinal symptoms and changes in sense of smell or taste.[8,9]

Whether children are also less often infected by SARS-CoV-2 is an ongoing debate. Large epidemiological studies suggest that children comprise only 1 to 2% of all SARS-CoV-2 cases.[10-12] However, these numbers heavily depend on testing criteria and, in many reports, testing was done only in individuals who were symptomatic or required hospitalization, which is less often the case for children. Some studies suggest that children are just as likely as adults to become infected with SARS-CoV-2.[13] However, many recent studies report that children are less likely to get infected after coming in contact with a SARS-CoV-2-positive individual.[14-18]

It has been proposed that children and adolescents have similar viral loads as of adults and may therefore be as likely to transmit the infection of SARS-CoV-2 as adults.[19-22] In addition, some studies suggest that the viral load in asymptomatic and symptomatic individuals infected with SARS-CoV-2 is similar.[23-25] However, assuringly, transmission in schools from children either to other children or to adults has been quite rare.[26-28]

The observation that children and adolescents are less frequently infected with SARS-CoV-2 and that they have less severe symptoms compared to adults is similar to that reported for SARS-CoV-1 and Middle east respiratory syndrome (MERS)-CoV.[29-31] However, this pattern is strikingly different to that for infection with most of the other respiratory viruses [e.g., respiratory syncytial virus (RSV), metapneumovirus, parainfluenza or influenza viruses], for which the prevalence and severity are both higher in children.[32]

Emergence of newer strains/variants of COVID-19 such as B.1.1.7, during the second and third waves in many countries have resulted in the hypothesis that the children and adolescents, the age-group which was least susceptible to the classical or original strains of SARS-CoV-2 would be most affected and the new variants may be more severe in this age-group compared to adults. However, few studies conducted among those infected with newer variants such as B.1.1.7 have found that children and adolescents still remain the least affected age-group and mortality, which is quite rare and only in those children who have co-morbidities like cancer or type 1 diabetes, in them due to the newer strains is found comparable to the earlier or original strains of the virus.

CONCLUSION

No evidence of more severe disease has been found in children and young people during the second and/or third wave of COVID-19 pandemic, suggesting that infection with the newer variants of SARS-CoV-2 does not result in an appreciably different clinical course to the original or earlier strains. Severe acute respiratory COVID-19 still remains an uncommon occurrence in children and young people.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. CDC. COVID-19 in Children and Teens, 2021. Available at: https://www.cdc.gov/coronavirus/2019ncov/groups/families-children.html. Accessed on 16 June 2021.
2. CDC. COVID-19 in Children and Teens, 2021. Available at: https://www.cdc.gov/coronavirus/2019ncov/transmission/variant.html. Accessed on 16 June 2021.
3. Davies NG, Abbott S, Barnard RC, Jarvis CI, Kucharski AJ, Munday JD, et al. Estimated transmissibility and impact of SARS-CoV-2 lineage B.1.1.7 in England. Science. 2021;372(6538):3055.
4. Brookman S, Cook J, Zucherman M, Broughton S, Harman K, Gupta A. Effect of the new SARS-CoV-2 variant B.1.1.7 on children and young people. Lancet Child Adolesc Health. 2021;5(4):9-10.
5. Zimmermann P, Curtis N. Coronavirus Infections in Children Including COVID-19: An Overview of the Epidemiology, Clinical Features, Diagnosis, Treatment and Prevention Options in Children. Pediatr Infect Dis J. 2020;39(5):355-68.
6. Castagnoli R, Votto M, Licari A, Brambilla I, Bruno R, Perlini S, et al. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection in

Children and Adolescents: A Systematic Review. JAMA Pediatr. 2020;174(9):882-9.
7. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. Acta Paediatr. 2020;109:1088-95.
8. Zimmermann P, Curtis N. COVID-19 in Children, Pregnancy and Neonates: A Review of Epidemiologic and Clinical Features. Pediatr Infect Dis J. 2020;39(6):469-77.
9. Waterfield T, Watson C, Moore R, Ferris K, Tonry C, Watt A, et al. Seroprevalence of SARS-CoV-2 antibodies in children: a prospective multicentre cohort study. Arch Dis Child. 2021;106(7):680-6.
10. Wu Z, Googan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JAMA. 2020;323(13):1239-42.
11. CDC COVID-19 Response Team. Coronavirus Disease 2019 in Children - United States, February 12-April 2, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(14):422-6.
12. Parri N, Lenge M, Buonsenso D; Coronavirus Infection in Pediatric Emergency Departments (CONFIDENCE) Research Group. Children with Covid-19 in Pediatric Emergency Departments in Italy. N Engl J Med. 2020;383(2):187-90.
13. Bi Q, Wu Y, Mei S, Ye C, Zou X, Zhang Z, et al. Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. Lancet Infect Dis. 2020;20(8):911-9.
14. Zhang J, Litvinova M, Liang Y, Wang Y, Wang W, Zhao S, et al. Changes in contact patterns shape the dynamics of the COVID-19 outbreak in China. Science. 2020;368(6498):1481-6.
15. Jing QL, Liu MJ, Yuan J, Zhang ZB, Zhang AR, Dean NE, et al. Household Secondary Attack Rate of COVID-19 and Associated Determinants. medRxiv. 2020;20056010.
16. Mizumoto K, Omori R, Nishiura H. Age specificity of cases and attack rate of novel coronavirus disease (COVID-19). medRxiv. 2020;20033142.
17. Milani GP, Bottino I, Rocchi A, Marchisio P, Elli S, Agostoni C, et al. Frequency of Children vs Adults Carrying Severe Acute Respiratory Syndrome Coronavirus 2 Asymptomatically. JAMA Pediatr. 2021;175(2):193-4.
18. Viner RM, Mytton OT, Bonell C, Melendez GJ, Ward J, Hudson L, et al. Susceptibility to SARS-CoV-2 Infection Among Children and Adolescents Compared With Adults: A Systematic Review and Meta-analysis. JAMA Pediatr. 2021;175(2):143-56.
19. Jones TC, Muhlemann B, Veith T, Biele G, Marta Z, Hofmann J, et al. An analysis of SARS-CoV-2 viral load by patient age. MedRxiv. 2020;20125484.
20. Baggio S, Huillier AG, Yerly S, Bellon M, Wagner N, Rohr M, et al. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Viral Load in the Upper Respiratory Tract of Children and Adults With Early Acute Coronavirus Disease 2019 (COVID-19). Clin Infect Dis. 2021;73(1):148-50.
21. Park YJ, Choe YJ, Park O, Park SY, Kim YM, Kim J, et al. Contact Tracing during Coronavirus Disease Outbreak, South Korea, 2020. Emerg Infect Dis. 2020;26(10):2465-8.
22. Huillier AG, Torriani G, Pigny F, Kaiser L, Eckerle I. Culture-Competent SARS-CoV-2 in Nasopharynx of Symptomatic Neonates, Children, and Adolescents. Emerg Infect Dis. 2020;26(10):2494-7.
23. Lee S, Kim T, Lee E, Lee C, Kim H, Rhee H, et al. Clinical Course and Molecular Viral Shedding Among Asymptomatic and Symptomatic Patients With SARS-CoV-2 Infection in a Community Treatment Center in the Republic of Korea. JAMA Intern Med. 2020;180(11):1447-52.
24. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al. SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. N Engl J Med. 2020;382(12):1177-9.
25. Hurst JH, Heston SM, Chambers HN, Cunningham HM, Price MJ, Suarez L, et al. SARS-CoV-2 Infections Among Children in the Biospecimens from Respiratory Virus-Exposed Kids (BRAVE Kids) Study. Clin Infect Dis. 2020;1693.
26. NCIRS. Australian Immunisation Professionals Network (NCIRS-AIP) discussion forum, 2021. Available at: https://www.ncirs.org.au/covid-19-in-schools. Accessed on 18 June 2021.
27. National Institute for Public Health and the Environment Ministry of Health, Welfare and Sport. Children, school and COVID-19, 2021. Available at: https://www.rivm.nl/en/coronavirus-covidchildren-and-covid-19. Accessed on 18 June 2021.
28. Ladhani S. Prospective active national surveillance of preschools and primary schools for SARS-CoV-2 infection and transmission in England, June 2020 (sKIDs COVID-19 surveillance in school kids), 2020. Available at: https://assetspublishingservicegovuk/government/uploads/system/uploads/attachment_data/file/914700/sKIDs_Phase1Report_01sep2020pdf. Accessed on 18 June 2021.
29. Hon KL, Leung CW, Cheng WT, Chan PK, Chu WC, Kwan YW, et al. Clinical presentations and outcome of severe acute respiratory syndrome in children. Lancet. 2003;361(9370):1701-3.
30. Leung CW, Kwan YW, Ko PW, Chiu SS, Loung PY, Fong NC, et al. Severe acute respiratory syndrome among children. Pediatrics. 2004;113(6):535-43.
31. Tawfiq JA, Kattan RF, Memish ZA. Middle East respiratory syndrome coronavirus disease is rare in children: An update from Saudi Arabia. World J Clin Pediatr. 2016;5(4):391-6.
32. Tregoning JS, Schwarze J. Respiratory viral infections in infants: causes, clinical symptoms, virology, and immunology. Clin Microbiol Rev. 2010;23(1):74-98.

Cite this article as: Bashar MA, Begam N. Are children and young people more susceptible to the newer strains of SARS-CoV-2 than earlier ones? Current evidences. Int J Sci Rep 2021;7(10):514-6.