Original Article

Unveiling parental perspectives: COVID-19 vaccination for children in India

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Abstract

Background: Irrespective of the availability of a safe and effective COVID-19 vaccine and its success rate in adults, administering vaccines to children remains a challenge for healthcare workers. Children's vaccine hesitancy among parents remains substantial and is exacerbated due to misleading information. In the present study, we aimed to investigate the hesitancy of parents and their concern about the vaccination and clinical characteristics of COVID-19 in their children. **Methods:** A cross-sectional web-based and offline survey comprised of questions about the demographic of children, the status of COVID-19 infection, its severity, vaccination status, sources of information, willingness, concerns and attitude of parents to vaccinate their children against the COVID-19 virus, was conducted. Overall, 846 responses from parents fulfilling the inclusion criteria were analysed by GraphPad Prism 5. **Results:** Out of the 846 responses, 51.2% (n = 433) of children were vaccinated against COVID-19. Out of vaccinated children (51.2%), 60.3% (n = 261) had experienced adverse events. Around 21% (n = 98) of children had a history of exposure to the SARS-CoV-2 virus. Among the infected children, 14.3% were asymptomatic and 85.7% had symptoms. Approximately 8% of children had comorbidities, with chronic lung diseases and asthma being the most common. Among the 846 participating parents, 59.5% were mothers and the remaining 40.5% were fathers. A total of 2.7% and 22.2% of parents were found hesitant to administer the COVID-19 vaccine to their children aged 15–18 years and below 15 years, respectively. Among hesitant parents, mothers were found slightly more hesitant as compared to fathers. Also, 35.5% of parents were found hesitant about their own COVID-19 vaccination. Furthermore, the concern for COVID-19 vaccine unwillingness among parents is that a child has already achieved natural immunity after COVID-19 infections (76.8%) followed by vaccine safety and its side effects. The motivating factors to convince parents for their children's COVID-19 vaccination were if their doctors recommend it, followed by detailed information on vaccine side effects and efficacy in children. The most trusted source of information for the parents was found to be the healthcare workers. **Conclusion:** These results suggest that data and reviews regarding the safety and efficacy of the COVID-19 vaccine readily available in the public domain could serve as a highly effective strategy for promoting and implementing widespread vaccination among children. By providing easily accessible and comprehensive information, public health authorities can address parental concerns, dispel misconceptions and foster a greater sense of trust in the vaccination process.

Keywords: Children, coronavirus, COVID-19 vaccine, parents, vaccine hesitancy

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Introduction

The global pandemic caused due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) depicts a peculiar pattern of infection among children as compared to adults.[1,2] As of June 24, 2023, 1847 child deaths due to COVID-19 have been reported globally despite epidemiological studies

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showing reduced severity and mortality among children compared to adults.[3,4] As the epidemic progresses, more direct and indirect health effects of SARS-CoV-2 become apparent implicating a differential pathogenesis of SARS-CoV-2.[3,4] The side effects of COVID-19 have had serious repercussions on children's mental and physical health. A non-negligible fraction of children with COVID-19 were reported to suffer from a potent post-infection inflammation known as multisystem inflammatory syndrome (MIS-C).[5] In addition, several studies have demonstrated that severe COVID-19 and mortality among children were due to MIS-C.[6-8]

Multiple pieces of evidence have confirmed the effectiveness of COVID-19 vaccines in reducing severe illness and fatalities caused by coronavirus infections.[9,10] As a result, it is crucial to achieve high vaccination coverage among both adults and children to bring an end to the emergency phase of the coronavirus infection. The government of India has officially approved the Covaxin (BB152) vaccine (Bharat Biotech, Hyderabad, India) for children aged 15–18 years from January 3, 2022.[11] However, Covaxin (BB152) use for the younger children (<12 years) is still under clinical trial. Similarly, other COVID-19 vaccines such as Corbevax (developed by Biological E limited) and ZyCoV-D (developed by Zydus Cadila) for children aged 5–17 years and 12–17 years respectively are under phase 3 of the clinical trial.[12]

Irrespective of successful COVID-19 vaccination in adults and its pivotal role in mitigating the emergency phase of coronavirus, vaccination in children is a challenge for policymakers. Since parents are caregivers or guardians of children, acceptance and hesitancy of the COVID-19 vaccine by parents for their children is a critical key factor in contributing to the successful mass vaccination drive. According to the World Health Organization (WHO), vaccine hesitancy is a significant factor contributing to the global health threat.[13] Numerous parameters such as complacency, convenience and confidence regarding the safety, efficacy and side effects of COVID-19 vaccine influenced the hesitancy of parents towards vaccines.[14,15] Therefore, evaluating parents' hesitancy and their concern towards the COVID-19 vaccine for their children will aid in tracking the misinformation about vaccines that will further assist in designing strategies for the successful rollout of the COVID-19 vaccine among children. Thus, the objective of the present study was to investigate the hesitancy among parents of children aged 15–18 years and below 15 years and their attitude towards vaccination of children against the COVID-19 virus.

Material and Methods

Study design

We conducted a cross-sectional online and offline survey among Indian parents between March and June 2022. We identified variables from our previous published study carried out by Jetly *et al.*[16] and conceptualized the present study on parents' hesitancy towards COVID-19 vaccination for their children. The survey questionnaire was formulated by incorporating questions based on expert opinion and obtained through consultations with senior physicians (who were involved in treatment and management of COVID-19) across four leading government hospitals of Delhi-NCR and input from academic colleagues. The survey study was based on the ICMR-approved guidelines. The survey questionnaire included questions about the demographics of children and parents, comorbidities among children, the incidence of COVID-19 among children, parental hesitancy and attitude towards vaccinating their children with the COVID-19 vaccine and source of information about the COVID-19 vaccine. An online survey was conducted via Google form, and an offline survey was conducted with the assistance of skilled healthcare professionals (trained under clinicians). The snowball sampling method was used to collect the data. The detailed procedure for collecting offline forms has also been described earlier in Arora *et al.*[17] Briefly, Accredited Social Health Activist (ASHA) who were working under the supervision of doctors associated with the Delhi Government Hospital collected the filled form via a door-to-door survey. For conducting the present survey, they were explained to include parents with children under the age of 18 years.

The only inclusion criterion considered was the survey administered to Indian parents who have at least one child under the age of 18 years and the given informed consent. We excluded those who did not provide complete information or parents without children. The present study involving the Google survey questionnaire was approved by the Institutional Ethics Committee (ACBR/IHEC/DS-COVID6/02-2022) of the Delhi School of Public Health, IoE and Dr. B.R. Ambedkar Centre for Biomedical Research (ACBR), University of Delhi, India.

Statistical analyses

The data used in the present study was collected from both an online and offline cross-sectional survey of Indian parents. Descriptive statistics were used to calculate hesitancy, concerns and motivating factors among parents of children aged 15–18 years and below 15 years. A total of 900 responses from Indian parents were collected through the snowball sampling method. Overall, 846 responses from parents fulfilling the inclusion criteria were analysed by GraphPad Prism 5 [Figure 1].

Results

Demographic profile of children

Table 1 presents the demographic profile of the 846 children surveyed, with 49.5% being male and 50.5% female. Among them, 60.9% (n = 515) were aged between 0 and 14 years, while 39.1% (n = 331) were between 15 and 18 years. The majority of children had blood group B (34.0%), followed by blood groups A (26.9%), O (24.5%) and AB (14.7%). Most participants (81.9%) were from urban areas, followed by sub-urban (11%) and rural areas (7%). Regarding vaccination, 25% of children had received a flu vaccine between September

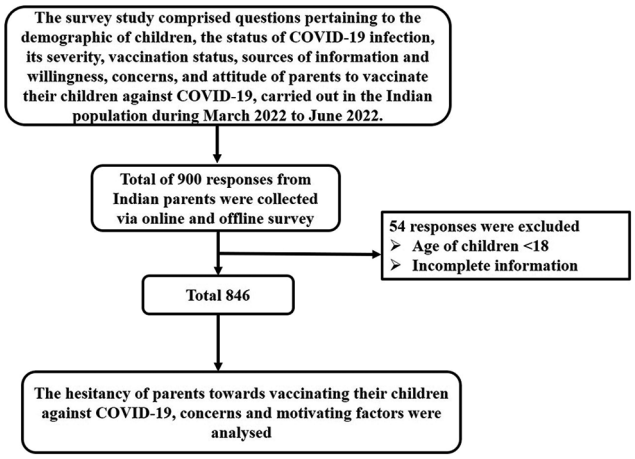

Figure 1: Flow chart of the number of parents included in the study

2019 and last date of our form collection. For COVID-19, 51.1% of children had been vaccinated, with 36.8% receiving both doses and 14.3% getting a single dose. Out of 433 vaccinated children, 60.3% (n = 261) had experienced adverse events, with most (64%) reporting them after one dose. Of the parents, 21% (n = 98) reported their children's history of exposure to the SARS-CoV-2 virus, while 79% (n = 369) had not contracted COVID-19. Among the infected, 14.3% (n = 14) were asymptomatic, and 85.7% (n = 84) had symptoms. Among symptomatic cases, 64.3% (n = 54) experienced mild symptoms, 34.5% (n = 29) moderate symptoms and 1.2% (n = 1) severe symptoms. Approximately 8% of children had comorbidities, with chronic lung diseases, asthma, obesity and diabetes being the most common [Figure 2].

Parental hesitancy towards vaccinating their children against COVID-19

Out of the 846 parents surveyed, 59.5% were mothers (n = 503) and the remaining 40.5% (n = 343) were fathers. Around 97.3% (n = 495) of parents expressed willingness to vaccinate their children aged 15–18 years against COVID-19 in the future while 22.2% (n = 154) of the parents of children below 15 years were hesitant [Table 2]. Among parents, mothers were found to be more hesitant to vaccinate their children (aged 15–18 years and below 15 years) than fathers [Table 3]. However, gender difference was not significant among hesitant parents. Additionally, 16.8% of parents were hesitant to vaccinate their children even if schools mandate it. However, 79% of parents were still intent on vaccinating their children, even if they had a previous COVID-19 infection [Table 2]. Interestingly, 35.5% (n = 300) of parents were hesitant to take the COVID-19 vaccine themselves, and 17.6% were unsatisfied after taking the COVID-19 vaccine.

Causes of Concern among parents towards vaccinating their children with COVID-19 vaccine

About 68.1% (n = 576, 576/846) had concerns about COVID-19 vaccination in their children. To understand the reasoning behind vaccine hesitancy, we further asked the parents for their concern and reluctance against COVID-19 vaccination for their children. As shown in Figure 3, the most common reason cited for COVID-19 vaccine unwillingness among parents is that a child has already achieved natural immunity after COVID-19 infections (76.8%). The concern of parents in second place was safety (73.5%) and side effects or adverse events (70.3%) of COVID-19 vaccination in children. Around 55.1% of parents believed that the COVID-19 vaccine for children was not a

Table 1: Demographic profile of children (*n*=846)

Variables	*n* (%)
Gender	
Males	419 (49.5)
Females	427 (50.5)
Age groups (Years)	
0-14	515 (60.9)
15-18	331 (39.1)
Blood groups	
A+/A-	182/18 (24.5/2.4)
B+/B-	208/45 (28.0/6.0)
O+/O-	149/33 (20.0/4.4)
AB+/AB-	57/52 (7.7/7.0)
Place	
Urban	693 (81.9)
Sub-urban	91 (10.8)
Rural	62 (7.3)
Did your child receive flu vaccine any time between September 2019 and today?	
Yes	208 (24.6)
No	638 (75.4)
Is your child vaccinated with COVID-19 Vaccine?	
Yes, one dose	121 (14.3)
Yes, both doses	312 (36.8)
No	80 (9.5)
Not Available	333 (39.4)
Did child experienced adverse events following the immunization? (*n*=261)	
Yes, after one dose	167 (64.0)
Yes, after both doses	94 (36.0)
Did your child suffer from COVID-19? (*n*=467)	
Yes (Not tested)	59 (12.6)
Yes (Tested)	39 (8.4)
No	369 (79.0)
If yes COVID positive, how many times? (*n*=66)	
Once	60 (90.9)
Twice	6 (9.1)
If yes COVID +, what type it was (*n*=98)	
Asymptomatic	14 (14.3)
Symptomatic	84 (85.7)
Mild	54/84 (64.3)
Moderate	29/84 (34.5)
Severe	1/84 (1.2)
Does your child suffer from any medical condition/disease/comorbidity that put child at risk of getting COVID infection.	
Yes	68 (8.0)
No	778 (92.0)

solution to end the pandemic. In addition, 21.2% of parents had concerns about the effectiveness of the COVID-19 vaccine in children.

Motivation to get vaccinated

It is crucial to understand the motivating factors for hesitant parents regarding their children's COVID-19 vaccination. Among them, 54.2% are convinced if their doctors recommend it, while 30.3% seek detailed information on vaccine side effects and efficacy in children [Figure 4]. Additionally, 8% are influenced by observing other children's response to the vaccine, and 7% await approval from legal authorities for vaccinating children against COVID-19.

Most trusted source of information on COVID-19 vaccination

Figure 5 shows parents' most credible sources of information for vaccinating their children against COVID-19. Healthcare workers were the most trusted source (47.4%), followed by social media (24%), news channels (20%) and family friends (6.9%).

Discussion

Although COVID-19 vaccination efforts for adults have been widely effective, spreading the vaccination to children presents distinct challenges. The WHO recognizes vaccine hesitancy as a major factor contributing to global health risks, underscoring the critical role of parental decisions in determining vaccination uptake. Since parents are the primary carers of children, their acceptance or reluctance to vaccinate children against COVID-19 significantly impacts the overall success of mass vaccination

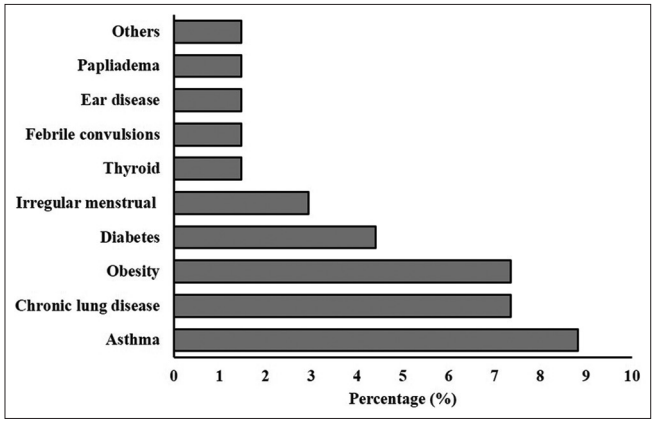

Figure 2: Comorbidities among children

Table 2: Parental hesitancy towards vaccinating their children with COVID-19 vaccine

Variables	*n* (%)
If your child (15–18 year) is not yet vaccinated, are you willing to give COVID-19 vaccine in future?	
Yes	495 (97.3)
No	14 (2.7)
Are you willing to give COVID-19 vaccine to your child (below 15 year) if available in future?	
Yes	539 (77.8)
No	154 (22.2)
Are you willing to give COVID vaccine If school mandate COVID vaccination for children, when available?	
Yes	704 (83.2.0)
No	142 (16.8)
Are you willing to give COVID vaccine to your child even after he/she was COVID positive earlier.	
Yes	537 (79.0)
No	143 (21.0)
Were you reluctant/hesitant to take COVID vaccination for yourself?	
Yes	300 (35.5)
No	546 (64.5)
If yes reluctant, are you satisfied now after taking COVID vaccination?	
Yes	697 (82.4)
No	149 (17.6)

Table 3: Gender disparity in parental hesitancy towards COVID-19 vaccination for children

Variables	Total hesitant	Male (%)	Female (%)
Hesitant for vaccinating children (15–18 years) against COVID-19	14	6 (42.9)	8 (57.1)
Hesitant for vaccinating children (below 15 years) against COVID-19	154	72 (46.8)	82 (53.2)

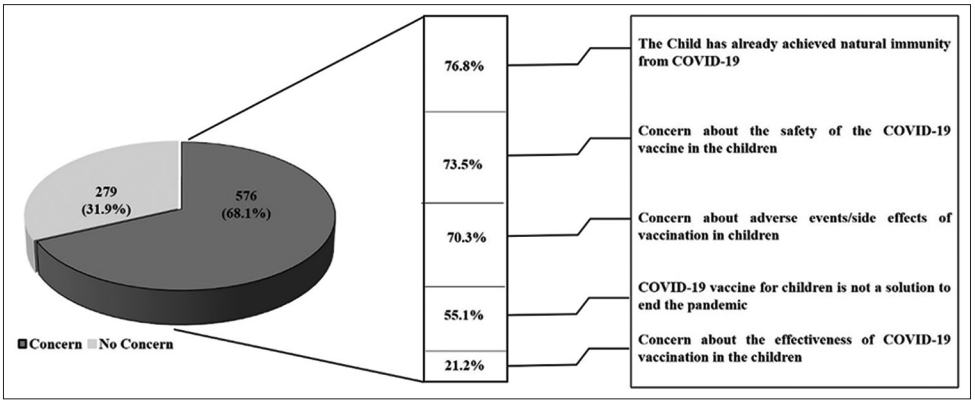

Figure 3: Concern of parents towards vaccinating their children with COVID-19 vaccine

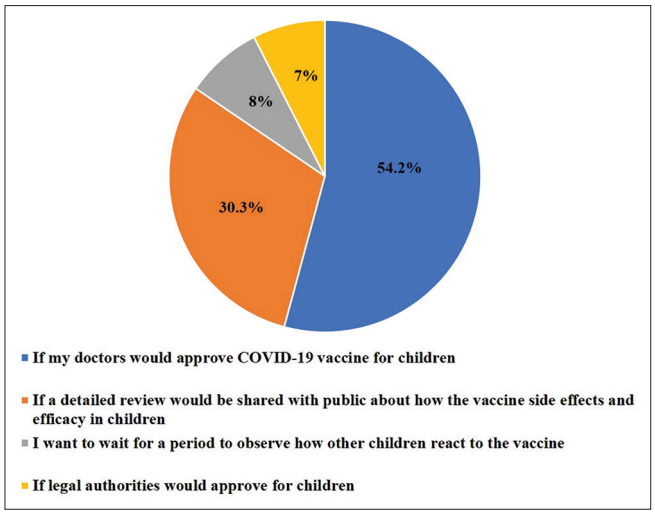

Figure 4: Motivating factors by parents to decide them to vaccinate their children

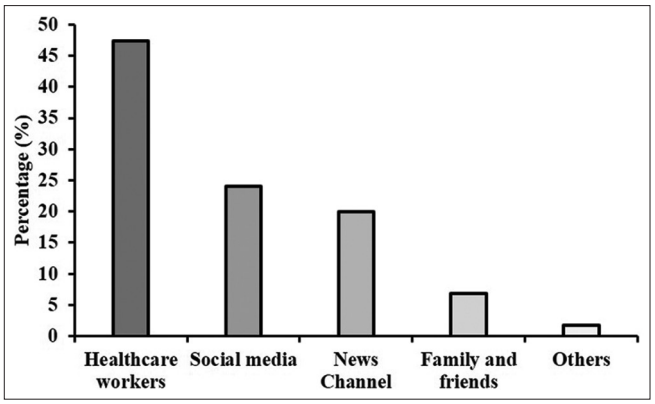

Figure 5: Source of information among parents for the children's COVID-19 vaccine

initiatives targeting the younger population. Hence, the purpose of the study was to investigate parental hesitancy regarding vaccination for children under 15 years old and between 15 and 18 years old. Additionally, we explored the specific concerns of parents that might be barriers to vaccinating their children against COVID-19. Our findings revealed that parents of children below 15 years showed higher levels of hesitancy (22.2%) towards COVID-19 vaccination compared to parents of children aged 15–18 years (2.7%). In line with our results, a separate study in Japan also reported a significant proportion (33.5%) of hesitancy among parents of children under 14 years old.[18] Similarly, another study among Thai parents carried out by Kitro *et al.*[19] found a significantly higher COVID-19 vaccine hesitancy among parents of children under the age of 12 years than the parents of older children. Contrary to the previous Indian cross-sectional study,[20] our research revealed a significantly higher rate of COVID-19 vaccine acceptance among parents. This acceptance level was nearly comparable to that observed in similar studies conducted in China (73%), New Zealand (80%) and England (89%).[21-23] Furthermore, our results are consistent with the previous studies, revealing a slightly higher hesitancy among mothers compared to fathers regarding COVID-19 vaccination for their children.[24-26]

Attitudes and experiences of parents are important parameters to assess parents' willingness to vaccinate their children against the COVID-19 virus. In our study, 35.5% of parents were reluctant to take the COVID-19 vaccine for themselves, depicting that parents' intentions play a significant role in determining their willingness to vaccinate their children, and our results are in agreement with the previous studies done by Horiuchi *et al.* and Wan *et al.*[18,27] Surprisingly, 17.6% of parents are still not satisfied with their own COVID-19 vaccination, indicating the dire need to educate the general population pertinent to the recommended COVID-19 vaccination.

A significant proportion of parents believed that their children do not require COVID-19 vaccination as they had a history of COVID-19 infection and had developed natural immunity against SARS-CoV-2. Therefore, to provide accurate and reliable information to individuals and communities and dispel misconceptions, public health campaigns play a crucial role in educating the public. By disseminating correct information about the benefits of COVID-19 vaccination, including the potential for added protection even for those who have previously been infected, these campaigns can help address vaccine hesitancy and encourage parents to make informed decisions for their children's health. Fostering a clear understanding of how natural immunity and vaccination work together can contribute to more comprehensive and effective strategies for controlling the spread of COVID-19 and its variants. More than 70% of the parents had concerns about the safety and side effects of the COVID-19 vaccine. Several other studies also reported a similar concern indicating that vaccine safety is essential in building parents' trust in vaccines.[20,28] Therefore, to build parents' trust, health authorities and healthcare providers should communicate transparently and effectively about the benefits and safety of COVID-19 vaccines for children.

Additionally, when we inquired about the factors that could persuade parents to vaccinate their children, a significant 54.2% of parents stated that they would be more inclined to vaccinate if their doctor recommended it which highlights the influence of healthcare providers in shaping parental decisions. The results are a replication of our previous study conducted among people aged ≥18 years, where 33.3% of respondents were convinced of COVID-19 vaccination for themselves, once their doctors approved it.[16] Therefore, incorporating healthcare professionals into awareness programs, providing them with the latest vaccine information and equipping them with effective communication strategies are key steps in addressing parental hesitancy and promoting COVID-19 vaccination for children. Their influence can go a long way in ensuring that accurate and reliable information reaches parents, leading to better-informed decisions about vaccination. Furthermore, our research revealed that healthcare professionals were the most trusted source of information for parents, followed by social

media. Our results are consistent with the previous survey study conducted in the United States where the key source of information for their children's COVID-19 vaccination was a paediatrician.[29] Also, previous studies showed the impact of healthcare recommendations on reducing COVID-19 vaccine hesitancy.[30,31] To address parental hesitancy towards childhood COVID-19 vaccination, it is crucial to disseminate reliable information through healthcare professionals, official government websites and social media platforms. Public health campaigns should provide accurate comprehensive information about COVID-19 vaccines, addressing myths and misconceptions on its safety and efficacy to enhance parents' acceptance of vaccinating their young children. These campaigns can use multiple channels, including television, radio, social media and community outreach. It is imperative to ensure that parents have access to reliable and up-to-date information to make informed decisions for the health and safety of their children. Public health efforts should emphasize the importance of vaccination as a key tool in controlling the spread of the virus and achieving herd immunity, thereby safeguarding both individual and community well-being.

Conclusion

In conclusion, despite the global vaccination drive leading to a reduction in the severity and mortality of COVID-19 cases, the reluctance of parents to vaccinate their children, particularly those below the age of 15 years, remains a growing concern. Paediatricians play a crucial role in engaging with parents, guiding them to comprehend the significance of administering the recommended COVID-19 vaccine for children. Providing evidence-based information through various communication channels can empower parents to make well-informed choices about vaccinating their children and contribute to overall public health efforts.

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Ethics approval

The present study has been approved by the Institutional Human Ethics Committee of Delhi School of Public Health, IoE and Dr. B.R. Ambedkar Centre for Biomedical Research, University of Delhi, India, as per ICMR guidelines (ACBR/IHEC/DS-COVID6/02-2022).

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Conflicts of interest

There are no conflicts of interest.

References

1. 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.
2. Hoang A, Chorath K, Moreira A, Evans M, Burmeister-Morton F, Burmeister F, *et al.* COVID-19 in 7780 pediatric patients: A systematic review. EClinicalMedicine 2020;24:100433.
3. Provisional COVID-19 Deaths: Focus on Ages 0-18 Years. Available from: https://data.cdc.gov/NCHS/Provisional-COVID-19-Deaths-Focus-on-Ages-0-18-Yea/nr4s-juj3/.
4. Howard-Jones AR, Bowen AC, Danchin M, Koirala A, Sharma K, Yeoh DK, *et al.* COVID-19 in children: I. Epidemiology, prevention and indirect impacts. J Paediatr Child Health 2022;58:39-45.
5. Godfred-Cato S, Bryant B, Leung J, Oster ME, Conklin L, Abrams J, *et al.* COVID-19-associated multisystem inflammatory syndrome in children-United States, March-July 2020. MMWR Morb Mortal Wkly Rep 2020;69:1074-80.
6. Mohsin SS, Abbas Q, Chowdhary D, Khalid F, Sheikh AS, Ali Khan ZG, *et al.* Multisystem inflammatory syndrome (MIS-C) in Pakistani children: A description of the phenotypes and comparison with historical cohorts of children with Kawasaki disease and myocarditis. PLoS One 2021;16:e0253625.
7. Gonzalez-Dambrauskas S, Vasquez-Hoyos P, Camporesi A, Cantillano EM, Dallefeld S, Dominguez-Rojas J, *et al.* Critical coronavirus and kids epidemiological (CAKE) study investigators. Paediatric critical COVID-19 and mortality in a multinational prospective cohort. Lancet Reg Health Am 2022;12:100272.
8. Feldstein LR, Tenforde MW, Friedman KG, Newhams M, Rose EB, Dapul H, *et al.* characteristics and outcomes of US children and adolescents with multisystem inflammatory syndrome in children (MIS-C) compared with severe acute COVID-19. JAMA 2021;325:1074-87.
9. Rahmani K, Shavaleh R, Forouhi M, Disfani HF, Kamandi M, Oskooi RK, *et al.* The effectiveness of COVID-19 vaccines in reducing the incidence, hospitalization, and mortality from COVID-19: A systematic review and meta-analysis. Front Public Health 2022;10:873596.
10. Huespe IA, Ferraris A, Lalueza A, Valdez PR, Peroni ML, Cayetti LA, *et al.* COVID-19 vaccines reduce mortality in hospitalized patients with oxygen requirements: Differences between vaccine subtypes. A multicontinental cohort study. J Med Virol 2023;95:e28786.
11. Ministry of Health and Family Welfare. Guidelines for COVID-19 vaccination of children between 15-18 years and precaution dose to HCWs, FLWs & 60+population with comorbidities. 2022. Available from: https://www.mohfw.gov.in/pdf/GuidelinesforCOVID19VaccinationofChildrenbetween15to18yearsandPrecautionDosetoHCWsFLWs&60populationwithcomorbidities.pdf.
12. Gupta SL, Tyagi R, Dhar A, Oswal N, Khandelwal A, Jaiswal RK. Children's SARS-CoV-2 infection and their vaccination. Vaccines (Basel) 2023;11:418.
13. Centers for Disease Control and Prevention (CDC). Ten great public health achievements--worldwide, 2001–2010. MMWR Morb Mortal Wkly Rep 2011;60:814–8.
14. MacDonald NE; SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: Definition, scope and determinants.

Vaccine 2015;33:4161-4.

15. Yılmaz M, Sahin MK. Parents' willingness and attitudes concerning the COVID-19 vaccine: A cross-sectional study. Int J Clin Pract 2021;75:e14364.
16. Jetly S, Bhardwaj P, Arora G, Saluja D, Yadav SK, Naidu KP, *et al.* Hesitancy and acceptance of COVID-19 vaccination amidst the second wave of pandemic in India: A general population study. Asia Pac J Public Health 2022;34:446-9.
17. Arora G, Taneja J, Bhardwaj P, Goyal S, Naidu K, Yadav SK, Saluja D, Jetly S. Adverse events and breakthrough infections associated with COVID-19 vaccination in the Indian population. J Med Virol 2022;94:3147-54.
18. Horiuchi S, Sakamoto H, Abe SK, Shinohara R, Kushima M, Otawa S, *et al.* Factors of parental COVID-19 vaccine hesitancy: A cross sectional study in Japan. PLoS One 2021;16:e0261121.
19. Kitro A, Sirikul W, Dilokkhamaruk E, Sumitmoh G, Pasirayut S, Wongcharoen A, *et al.* COVID-19 vaccine hesitancy and influential factors among Thai parents and guardians to vaccinate their children. Vaccine X 2022;11:100182.
20. Padhi BK, Satapathy P, Rajagopal V, Rustagi N, Vij J, Jain L, *et al.* Parents' perceptions and intention to vaccinate their children against COVID-19: Results from a cross-sectional national survey in India. Front Med (Lausanne) 2022;9:806702.
21. Wang Z, She R, Chen X, Li L, Li L, Huang Z, *et al.* Parental acceptability of COVID-19 vaccination for children under the age of 18 years among Chinese doctors and nurses: A cross-sectional online survey. Hum Vaccin Immunother 2021;17:3322-32.
22. Bell S, Clarke R, Mounier-Jack S, Walker JL, Paterson P. Parents' and guardians' views on the acceptability of a future COVID-19 vaccine: A multi-methods study in England. Vaccine 2020;38:7789-98.
23. Jeffs E, Lucas N, Walls T. CoVID-19: Parent and caregiver concerns about reopening New Zealand schools. J Paediatr Child Health 2021;57:403-8.
24. Alhazza SF, Altalhi AM, Alamri KM, Alenazi SS, Alqarni BA, Almohaya AM. Parents' hesitancy to vaccinate their children against COVID-19, a country-wide survey. Front Public Health 2022;10:755073.
25. Chen F, He Y, Shi Y. Parents' and guardians' willingness to vaccinate their children against COVID-19: A systematic review and meta-analysis. Vaccines (Basel) 2022;10:179.
26. Fedele F, Aria M, Esposito V, Micillo M, Cecere G, Spano M, *et al.* COVID-19 vaccine hesitancy: A survey in a population highly compliant to common vaccinations. Hum Vaccin Immunother 2021;17:3348-54.
27. Wan X, Huang H, Shang J, Xie Z, Jia R, Lu G, *et al.* Willingness and influential factors of parents of 3-6-year-old children to vaccinate their children with the COVID-19 vaccine in China. Hum Vaccin Immunother 2021;17:3969-74.
28. Opel DJ, Diekema DS, Ross LF. Should we mandate a COVID-19 vaccine for children? JAMA Pediatr 2021;175:125–6.
29. Szilagyi PG, Shah MD, Delgado JR, Thomas K, Vizueta N, Cui Y, *et al.* Parents' intentions and perceptions about COVID-19 vaccination for their children: Results from a national survey. Pediatrics 2021;148:e2021052335.
30. Fisher KA, Nguyen N, Fouayzi H, Singh S, Crawford S, Mazor KM. *et al.* Impact of a physician recommendation on COVID-19 vaccination intent among vaccine hesitant individuals. Patient Educ Couns 2023;106:107-12.
31. Nguyen KH, Yankey D, Lu PJ, Kriss JL, Brewer NT, Razzaghi H, *et al.* Report of health care provider recommendation for COVID-19 vaccination among adults, by recipient COVID-19 vaccination status and attitudes-United States, April-September 2021. MMWR Morb Mortal Wkly Rep 2021;70:1723-30.