

# Vaccinating our Children and Adolescents Against COVID-19

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As we write this Editorial, the COVID-19 pandemic's two-year run has cumulatively infected more than 430 million people worldwide, of whom 5.9 million died.<sup>1</sup> One relief was the low infectivity rates among children and adolescents. The World Health Organization (WHO) figures indicate that between December 13, 2019 and October 25, 2021, 1.9 million children under five years of age were infected with SARS-CoV-2 (2.0% of all cases in this period) of whom 1797 died (0.1% of all deaths). Among those aged 5–14 years, 7.1 million were infected (7.0% of all cases) leading to 1328 deaths (0.1% of all deaths).<sup>2</sup>

However, the COVID-19 statistics related to children are increasingly seen to be underestimations.<sup>3,4</sup> Unavoidable factors were behind this. At the beginning of the pandemic the scarce human and material resources were focused on top priority adults—senior citizens, adults with comorbidities, pregnant women, healthcare workers, etc. As children and adolescents tended to present with milder symptoms and were often asymptomatic,<sup>5</sup> they were monitored less and many cases went unreported.

Within the research fraternity, however, the role of children in the transmission of SARS-CoV-2 remained contentious.<sup>3</sup> Early in the epidemic a systemic meta-analysis by Zhu et al,<sup>6</sup> included 43 studies from 12 countries comprising 611 individuals including 102 children in 213 SARS-CoV-2 transmission clusters. Only eight (3.8%) of these clusters yielded pediatric index cases, suggesting that children's role in the transmission of COVID-19 was limited. On the other hand, a large contact-tracing study from South Korea

during periods of school closure reported 18.6% infectivity rate in the household contacts of school-aged children aged 10–19 years and 5.3% among the household contacts of children aged 0–9 years. In Southern India, Laxminarayan et al,<sup>7</sup> analyzed comprehensive surveillance and contact-tracing data of 84 965 COVID-19 cases from two high incidence areas and found high infection rates among children aged 0–14 years who were in contact with other infected children.

Currently, with most adults fully vaccinated, the age distribution of the newly detected cases and hospitalizations are reportedly shifting towards the unvaccinated youth, with increasing prevalence of severity and prolonged post COVID-19 symptoms.<sup>8</sup> The emergence of the delta variant of SARS-CoV-2 resulted in young children also showing higher infectivity and transmission rates.<sup>9,10</sup> With the highly transmissible latest variant of the virus, the omicron, children are making up a larger proportion of patients hospitalized with COVID-19 than in previous infection waves, but the actual risk for hospitalization is comparable to that of the delta variant.<sup>11</sup> Its severity is yet to be determined. As infected children and adults carry comparable levels of viral loads in their nasopharynx, they can be expected to transmit the virus in a similar manner to their households and close contacts.<sup>12</sup>

In the first year of the pandemic, in the absence of vaccines, the only reliable way to halt its spread was to impose mandatory lockdowns. Despite the lower prevalence of COVID-19 among the youth, institutions that catered to them—universities, colleges, schools, kindergartens, sports facilities—were among the first to close. With teaching and learning shifting to the Internet,

educational institutions continued to remain shut for nearly two years. Though highly disruptive, on hindsight, these bouts of lockdowns did contain transmissions successfully.

The extended school closures, however, caused significant psychological impact on children, and educationists and psychologists are increasingly calling for their early reopening.<sup>13</sup> The safest way to open schools and keep them open is to fully vaccinate all children.<sup>12</sup> With them back at school, parents and caregivers will be able to resume their workplaces, increasing their productivity and income levels. The world has already experienced how the 2021 adult vaccination drive against COVID-19 succeeded in averting a huge number of infections and hospitalizations and saved hundreds of thousands of lives.<sup>1</sup> It is time to repeat the exercise for children, now that an increasing array of COVID-19 vaccines have been tested and approved for pediatric use.

A fully vaccinated child population will also strengthen the herd immunity in the society, halting the further spread of the virus. Booster doses in adults and children are expected to reduce the impact of any new virus variants and further strengthen the herd immunity.

Emerging reports also suggest further benefits of vaccinating children and adolescents. For one, COVID-19 vaccine has been reported to protect young children from a rare condition known as multisystem inflammatory syndrome (MIS-C). Pediatric inflammatory MIS-C has been temporally associated with SARS-CoV-2 (PIMS-TS) and long COVID-19 syndrome. The risk of children contracting long COVID-19 is also increasing. It can impair children's quality of life, development, and perhaps leave a lifelong health impact.<sup>11,13</sup> However, the frequency and characteristics of such outcomes among children and teenagers are still under review.

Clinical trials have evaluated the safety, tolerability, and immunogenicity of the two-dose series of Pfizer-BioNTech COVID-19 in children aged 5 – < 12 years. This vaccine was found safe for this age group with 90.7% efficacy even when the delta variant was prevalent.<sup>14</sup> Similarly, Bihua Han and colleagues showed that the inactivated COVID-19 vaccine (CoronaVac) had good safety, tolerability, and immunogenicity in aged 3–17 years.<sup>15</sup> In present context of limited supply and distribution of immunization, our first priority should be to identify

and vaccinate children at higher risk of developing or progressing into a serious COVID-19-related illness.

Implementation of the vaccination drive among children is expected to be more challenging than among adults. The member states of WHO have affirmed that implementing COVID-19 vaccination programs during the pandemic requires rigorous planning and coordination of activities and resources ahead of time. Taking such meticulous preparations ensure all stakeholders at the country level are aligned and prepared for a smooth roll-out of the vaccination programs, including contingency plans for unforeseen challenges, and to ensure positive reception from the citizenry. Effective nationwide immunization of children requires the participation and confidence of many stakeholders, including parents, the public, and various government partners, and requires resources to be in place.

Accordingly, a socio-behavioral survey is due to be conducted among the general public and the healthcare workers (HCWs) in Oman to assess their perceptions and attitudes on vaccinating children and adolescents against COVID-19. The survey results will assist the policy makers to plan the vaccination drive. This will also help the policy makers to understand the prevalence and nature of vaccine hesitancy among the Omani public. This, in turn, will help generation of structured public education campaigns to inculcate a well-reasoned understanding of the need for vaccinating all children.<sup>16</sup> Most crucial here will be the role of HCWs, who are generally trusted by the public. The HCWs in Oman will be further trained and instructed to keep themselves updated with the latest developments in COVID-19 prevention and management, understand the people's misinformation and the fears, and be ready with clear scientific explanations that reassure and motivate the public towards acceptance of pediatric vaccines.

When a COVID-19 vaccination campaign for 12–18-year-old students commenced in August 2021, it was accepted by the resident Omanis and expatriates. In October 2021, the National Supreme Committee on COVID-19 approved immunization of children aged 5–11 years, pending the availability of pediatric vaccines.

The major considerations for the safe and timely administration of the COVID-19 among children and adolescents at a nationwide level will be: 1) regulatory and legal requirements; 2) framework for

decision-making regarding phased vaccination; 3) programmatic/logistics and operational processes; 4) post-vaccination surveillance of vaccine safety (preferably for a longer period than was done for adults); and 5) assessing the knowledge, acceptability, and perception of parents, HCWs, and the general public toward vaccinating children.

To conclude, the safe reopening of schools is our priority for which vaccinating all our children is essential. It will also boost herd immunity in the entire population of Oman and provide significant boost for safe resumption of general socio-economic activities. An initial socio-behavioral survey will assess the popular perceptions and reeducate the public on the benefit of vaccinating children and adolescents. The vaccines will be rolled out in phases starting with priority groups.

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