



Perspective

Asian Pacific Journal of Tropical Medicine

apjtm.org



doi:10.4103/1995-7645.329006

5-Year Impact Factor: 2.285

Recovery of child immunization programs post COVID–19

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Immunization is considered as the most effective measure to safely reducing the rate of vaccine-preventable diseases like tuberculosis, hepatitis B, diphtheria, tetanus, pertussis, polio, measles, *etc.*, and reducing infant mortality and morbidity, plus allowing children to grow up healthy. Over the past two centuries, vaccines have prevented an estimated two to three million deaths of children annually, prior to the coronavirus disease 2019 (COVID-19) pandemic. According to the World Health Organization and the United Nations Children's Fund, the COVID-19 pandemic has impacted routine health services, such as vaccines and checkups, as well as improvements in the ability to access vaccinations. These improvements impacted, not only the high-income countries but also, the low and middle-income countries (LMIC) including many Asian and Middle Eastern countries, where many children continue to face higher risks in relation to outbreaks of vaccine-preventable diseases. Globally, the vaccination rate for three doses of diphtheria-tetanus-pertussis (DTP) vaccine fell from about 86% in 2019 to 83% in 2020, and measles first dose, from 86% to 84%, respectively. It is recommended that a 95% uptake of two vaccine doses is required to control measles[1,2]. There were approximately 17 million children that are likely to have not received any vaccines during the year, especially individuals who live in conflict-ridden areas, remote places or the third world conditions, further widening the already tremendous inequities in vaccine access worldwide[1,2]. Moreover, the adoption of preventive measures against COVID-19, such as lockdowns and social distancing, increased numbers of children have missed vital vaccine doses. Disruptions in immunization services have been widespread since 2020; approximately 23 million children around the world missed out on their routine childhood vaccination schedule in 2020, the highest number since 2009, and an increase of 3.7 million children compared 2019[1,2]. Vaccination coverage of the region of Americas also fell, just 82% of children are fully vaccinated with DTP, down from 91% in 2016. Middle-income countries accounted for an increase of unvaccinated children, in particular, in India where it was reported that there was a significant decline in children receiving their first DTP vaccine between 2019 to 2020, more than 3 million children did not get their first DTP vaccine in 2020, up from the 1.4 million children in 2019,

also for DTP-3 coverage[1,2].

In Vietnam, the first COVID-19 case was reported in late January 2020; however, the COVID-19 pandemic has been controlled preliminarily with a few infected cases and deaths in the year 2020. For that reason, most of the activities of health care systems were less affected by the pandemic. Throughout 2020, the routine vaccination program was fully operational for children younger than 24 months. The recommendation by the Ministry of Health Vietnam at this time included one dose of Bacillus Calmette Guerin (BCG), three-doses of DTP, two-doses of measles, three-doses of *Haemophilus influenzae* type b (Hib), one dose of rubella, and three-doses of hepatitis B, so the coverage for essential childhood vaccines has remained within the targets of immunization (more than 90% rate of vaccinated children) across the country[1,3]. Since the end of April 2021, Vietnam has been severely affected by the fourth wave of the COVID-19 pandemic, with the emergence of the Delta variant, that spread rapidly to 63 cities and provinces, with the most affected being Ho Chi Minh City and most southern provinces[4]. In response to these outbreaks, the Government implemented a strict lockdown, and social distancing measures, across many parts of the country from June 2021, as well as encouraging preventive measures including washing hands and wearing face masks. In addition, many hospitals and health care personnel have converted their services to support the COVID-19 response. As a result, the health care system, which has previously been required to perform the routine immunization schedules and other non-emergency care services, was disrupted significantly

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How to cite this article: Huynh G, Nguyen HTN, Pham AL. Recovery of child immunization programs post COVID-19. Asian Pac J Trop Med 2021; 14(10): 429-430.

Article history: Received 17 October 2021
Accepted 22 October 2021

Revision 20 October 2021
Available online 29 October 2021

to focus on the COVID-19 response. Additionally, due to parental concerns about the transmission of COVID-19, difficulties due to lockdown measures and transportation disruptions, the number of children not receiving timely vaccinations, and even their first vaccinations, are predicted to increase in all areas, despite having no specific statistics for the first 6 months of the year in Vietnam.

There are a number of reasons that may contribute to a declining uptake of vaccinations. Firstly, the government strategy for preventing COVID-19 included a goal changing from COVID-19 Zero to the normal life with COVID-19, which included moving from a national strategy to local lockdown measures in the high-risk areas. This has created difficulty for people to access the vaccination services because they were required to stay at home under the orders of the Government, in order to decrease the spread of COVID-19. The roll on effect of this has impacted transportation, increased low economical conditions for many (lack of money), and seen a decline in outpatient visits of children, which has resulted in fewer vaccinations being administered. Secondly, because of vaccination policy, the health care systems focused on the national COVID-19 vaccine coverage campaign, so there has been a reduction in the vaccine supply of other vaccines for other preventable diseases. Additionally, the priority of the cold chain storage for COVID-19 vaccines has also contributed to the shortage of preventable vaccines for children in the Expanded Immunization Program. Thirdly, the psychological effects, due to parents being afraid of exposure to the COVID-19 from vaccination services, as well as people who have been supporting the COVID-19 anti-vaccination idea, has led to a reluctance to get and catch up with other vaccine-preventable diseases.

Routine vaccination for children induces long-term immunity to prevent many infectious diseases and reduces the transmission of infections within the community, so the maintained low coverage for most recommended pediatric immunization has a huge impact on global health and there are now expectations of considerable outbreaks of diseases after the COVID-19 pandemic. Nutritional deficiencies and the emergence of vaccine-preventable diseases will be still a burden for LMIC. Besides, the decline of routine childhood vaccination rates could affect the health of both children and their caregivers, leading to interruptions in future labor sources and risking potential severe economic declines. Poverty-related diseases are expected to spread in LMIC, as well as high-income countries, as a consequence of the reduction in immunization of preventable diseases over the past year.

The administration of childhood vaccinations is required to emphasize, as a crucial mission and ensure, that every child has an equal opportunity to access these vaccines. Interventions are needed to promote catch-up campaigns for all vaccinations, particularly in populations at risk for under-immunization by combining the vaccination services of the COVID-19 vaccine and other preventable diseases, but still need to adhere to preventive measures against COVID-19 (social distancing, washing hands, wearing masks, etc.) during vaccination process. As a second focus, it is essential to increase the capacity of vaccine storage for LMIC to optimize the resources for vaccine supply. At last but not least, there needs to be an enhanced knowledge campaign toward preventative diseases among the community *via* reliable sources of information, such as

social media and websites of the Ministry of Health, or hospitals, as well as direct messaging to remind parents and caregivers of the vaccination schedule in order to catch-up with missed immunizations[5].

In conclusion, Vietnam is currently relaxing social distancing requirements and permitting essential activities outside the home. Children who have not received vaccines will be more susceptible to vaccine-preventable diseases such as hepatitis B, DTP, polio, meningitis, measles, etc[6]. The policymakers and local health care providers at District and Commune levels need to begin communication campaigns to emphasize the importance of routine immunization, especially for children younger than 24 months to achieve a rapid catch-up vaccination to protect them from serious preventable diseases. Healthcare systems must ensure that potential new waves of the pandemic, as well as the COVID-19 vaccination campaigns, do not interrupt routine immunization and that catch-up activities continue to be promoted.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Authors' contributions

The conceptualization was done by HG and PLA. The literature and drafting of the manuscripts were conducted by HG and NTNH. The editing and supervision were performed by HG and PLA. All authors substantially contributed to drafting and revising the manuscript, as well as the final approval of the version to be submitted.

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