

The Interruption of Administering Routine Measles Vaccine in Nepal: A Point of Contention During and Post the Coronavirus Disease 2019 Pandemic?

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Abstract

The interruption of administering routine measles vaccinations has put a significant strain on Nepal's already overburdened health system. Over five significant measles outbreaks have occurred in Nepal since the country's nationwide lockdown began, including in Kathmandu, the Capital. The interruption of immunization programs, as well as a drop in the number of confirmed cases, may have a devastating effect in the coming days, placing the target of eliminating measles by 2023 in jeopardy. In this review, we weigh the long-term impact on public health and consequences of disrupting the national immunization program against staying at home to flatten the coronavirus disease 2019 (COVID-19) surge curve. We speculate that during and post the COVID-19 pandemic; the measles endemic is imminent, particularly due to socioeconomic gaps and unhygienic measures.

Key words: Coronavirus disease 2019, Infectious disease, Measles, Nepal, Southeast Asia region, Vaccine, World Health Organization

INTRODUCTION

A nationwide complete lockdown in Nepal was implemented on March 24, 2020, after the World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) as a Public Health Emergency of International Concern on January 30, 2020.^[1,2] The application of the National Immunization Programme (NIP) in the country was widely impacted due to the pandemic-induced lockdowns. NIP is one of the main components of sustainable development goals (SDGs), which has enabled Nepal to complete several milestones of the Millennium Development Goals such as a reduction in under-5 mortality.^[3] As a component of SDGs, it is

essential to ensure maximal vaccine administration to the pediatric population in Nepal. The immunization and maintenance of vaccine-preventable diseases (VPDs) is pivotal in controlling and eliminating measles, which was endemic in Nepal from 1994 to 2004 and had an annual incidence of 90,000 cases annually. After launching a routine measles vaccination program in the country in the late 1980s, Nepal achieved a 90% reduction in mortality due to measles from 38 in 2003 by more than 90%.^[4]

The Government of Nepal collaborated with member countries of the WHO South-East Asian Region (SEARO) to eliminate measles and rubella until 2023, by adopting the "Strategic Plan for Measles and Rubella Elimination 2020–2024." These actions set the groundwork to eliminate both diseases and focus on viable plans to achieve the elimination targets by 2023.^[5] However, due to the disruption of immunization by the ongoing COVID-19 pandemic, Nepal faced a major outbreak of measles, especially in five different districts, namely, Jhapa, Sarlahi, Dhading Lalitpur, and Kathmandu.^[6] It is pertinent to note that eliminating measles by 2023 is a substantial challenge for the country.

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Given the pandemic-induced setbacks, the following review presents a public health view and perspective of the past, present, and future measles vaccinations.

THE TRENDS AND FEARS OF ACQUIRING ROUTINE VACCINES DURING THE PANDEMIC IN NEPAL

The risk of contracting COVID-19 was perceived to be 49% among respondents in a household survey conducted by UNICEF Nepal between August and October 2020.^[7,8] Of 650,000 children who required the measles-rubella vaccines every year, 120,000 (about 20%) missed their scheduled dose in 2020.^[9] The coverage of the measles-rubella vaccine is already low in Nepal and the self-perceived risks of contracting COVID-19 by the population have negatively compounded the ongoing efforts to contain the contagious disease. The Government of Nepal completed a nationwide two-phased measles-rubella campaign in 2020 to immunize over 3 million children aged 9 months-5 years. The first phase started in February 1, 2, and 5 and the second phase was planned for March 2020 in provinces Bagmati, Gandaki, Lumbini, and Sudurpaschim, which were significantly affected by the COVID-19 pandemic. The temporary suspension of the second phase of the campaign and routine immunization program is expected to have long-term impacts on eradicating measles by 2023. Although vaccination efforts were resumed amidst the ongoing pandemic, many children were left unvaccinated due to the fear of contracting COVID-19 either through health care workers or visiting health-care centers. The coverage was documented to be 74% in Bagmati Province, the most severely affected province in terms of a measles outbreak and COVID-19 infection. The fear of being exposed to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as well as public movement restriction has led to the low coverage in the province.^[10]

MEASLES CASES REPORTED TO THE WHO DURING 2018–2020: TRENDS IN NEPAL

Figure 1 represents the annual incidence of measles cases reported to the WHO through the national disease surveillance system.^[11] The plot shows the number of cases reported every month, from 2018 to 2020. A total number of 260 positive cases were reported in 2018 followed by 431 and 401 in 2019 and 2020, respectively. The steep rise in measles cases from February to April 2020 amidst COVID-19 lockdown is a cause of contention for public health strategists in the nation. However, the decline in measles cases from April through December 2020 warrants concern as the lack of strong surveillance systems in Nepal may have led to diminished numbers during the lockdown.

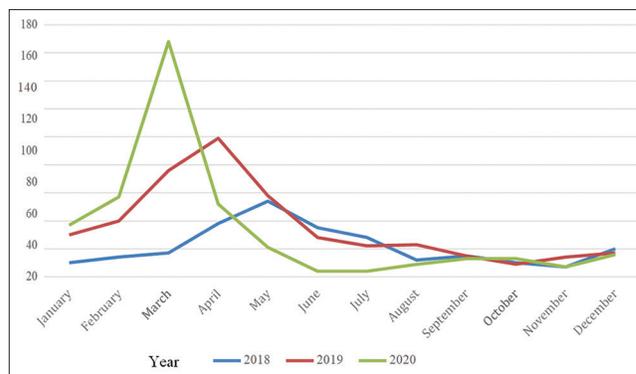


Figure 1: Measles cases were reported to WHO by Nepal for the years 2018, 2019, and 2020 (11)

While the transmission of measles and rubella seems to have been suppressed during the COVID-19 pandemic, it must be acknowledged that vulnerable populations are at direct risk of acquiring measles infections during and post the pandemic. At this juncture, ensuring the access to vaccination of all the susceptible populations is a cause of public health concern in Nepal. While it is currently unclear whether the long-lasting effects of the COVID-19 pandemic will undermine routine immunization efforts, a population-based study analyzing the pediatric population's vulnerability and outcomes are warranted. Robust surveillance of measles-like diseases and identification of high-risk areas with community transmission of measles for immediate action are the key to eliminate measles by 2023.

A BRIEF OVERVIEW OF VACCINATION TRENDS ACROSS THE GLOBE

Progress on immunization coverage is lacking, even before the COVID-19 pandemic struck the globe, at 85% for Diphtheria-Pertussis-Tetanus (DTP3) and measles vaccines. Despite the dearth of data, around 14 million children did not receive life-saving vaccines such as measles and DTP3 in 2019. A majority of these children were African residents and present similar health-care barriers as do Nepalese residents. Two-thirds of these 14 million children are concentrated in 10 low- and middle-income countries (LMICs): Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Mexico, Nigeria, Pakistan, and the Philippines.^[9] The progress and global success in achieving vaccination milestones is setback due to COVID-19-related barriers to health-care access. Many LMICs with documented epidemiological improvements are at risk of backsliding if immunization services are not restored.^[9] Visits of the pediatric patient population to any health facility have decreased drastically all over the world, possibly due to the halt in service provision at the majority of the vaccination centers across the

globe.^[9] Moreover, high-income countries have faced a similar decline.^[12] The immunization rates in the United States (US) dropped to as much as 73%, translating to the statistic, that three in four children have not received their vaccine dose.^[9] The United Kingdom (UK) also faced a fall in emergency department visits by over 90% during April 2020. Legal guardians and parents expressed concerns about overburdening the national health-care system and fears of being exposed to COVID-19 on routine vaccination visits.^[13] In parts of Africa like DR Congo, thorough care is recorded for COVID-19 and Ebola virus disease; moreover, there have been 369,520 measles cases with 6779 deaths in the past year suggesting a potential threat of a resurgence of another vaccine-preventable infectious disease.^[14]

AN EPIDEMIOLOGICAL OVERVIEW OF MEASLES IN THE SEARO REGION

An epidemiological qualitative overview of measles in the SEARO region is presented, with the following countries: Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor-Leste. As illustrated in Figure 2, the total number of confirmed measles cases has been the highest in India (5598), followed by Bangladesh (2410), Thailand (789), Indonesia (393), and Nepal (388). Nepal is ranked fifth, with the highest number of confirmed cases in 2021. As compared to larger populations like India, the relative incidence in Nepal has peaked through May 2021.

A comparison of the number of measles cases reported by confirmation methods until May 2021 in the SEARO region is illustrated in Figure 3. On noting the methods and the total number of reported cases in the region, India faced the highest burden of disease, with the highest number of lab-confirmed measles cases. An EPI link was also found to be the highest in India followed by Nepal as the second highest country to have lab-confirmed measles cases [Figure 3]. As of May 2021, the population of Nepal is 29,602,256, while India’s population is 1,392,086,685. On analyzing these trends qualitatively, it is of note to public health authorities that the individual number of cases in Nepal is comparable to those reported in India, necessitating active surveillance in Nepal.

On noting the incidence rate per 1,000,000 total population as of May 2021, Maldives presented with the highest incidence at 40% [Figure 4]. While surveillance systems have possibly weakened due to lack of accessibility during the pandemic, the trends are significant. Nepal had the second highest incidence with a documented rate of 17% followed by Thailand (15%) and Myanmar (15%). India, which reported the maximum number of cases as of May

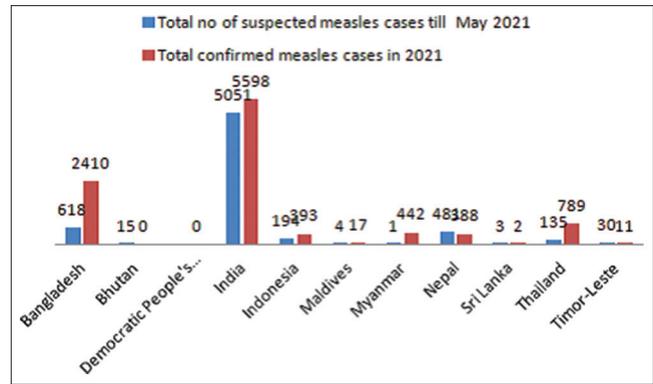


Figure 2: A comparative bar diagram to assess the number of measles cases reported in the SEARO region

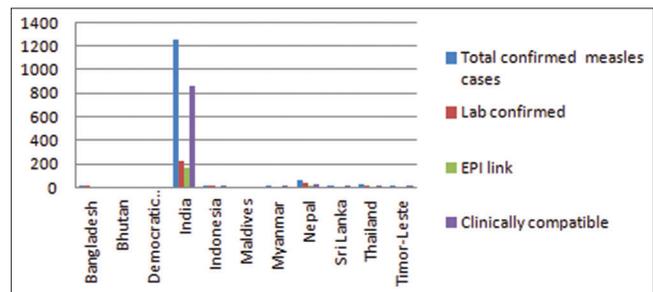


Figure 3: The number of measles cases reported in the SEARO region by confirmation methods as of May 2021

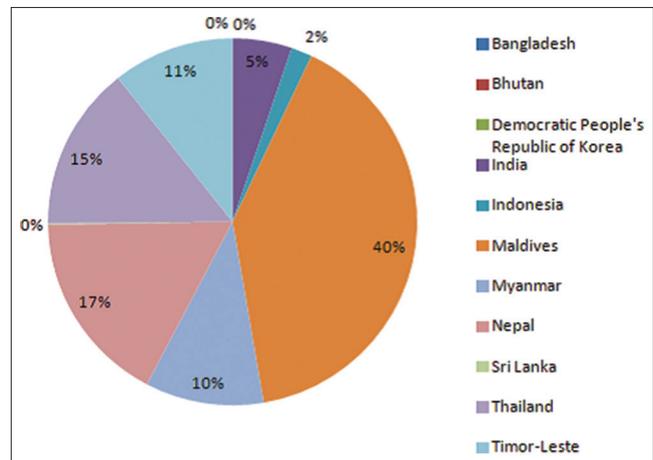


Figure 4: The rate of measles incidence per 1,000,000 total populations as of May 2021

2021, had a documented incidence of 5%, which leads to concerns about the rapid uprise in both Nepal and the Maldives [Figure 4].

NOTABLE DISCREPANCIES IN OUTCOMES OF SUSPENDED VACCINATION SCHEDULES

As global health authorities have spent their time, finances, and health care workers planning on the impact

of the coronavirus pandemic, measles outbreaks have gained recurrence in the South-East Asian region. A disproportionate proportion of populations, especially those of the socioeconomically stratified group, is impacted indefinitely. According to a Nepalese study, national immunization programs ought to increase immunization coverage in the country at large, with a specific focus on mothers with disadvantaged backgrounds and the economically stratified.^[15] Consequently, in the least developed countries such as DRC or Nepal, the logistic and infrastructural limitations within the health-care delivery system contributed to inadequate vaccination coverage. Clinics have been understaffed, lacked vaccine supplies on a rolling basis, and lacked the necessary equipment, power, or generators to ensure cold chain running. In addition, an inefficient cold chain, in combination with a Supplemental Immunization Activity and a 5-day time limit, presents an obstacle, as these limitations prohibit these campaigns from reaching children in rural areas.^[16] Dropout rates are also a major challenge, wherein public health authorities have been unable to reach the remotest corners of members in the SEARO, and children have missed their vaccinations because of migration.^[7] Many developing countries such as Maldives and Nepal, in Southeast Asia, reported a high incidence of measles per 1,000,000 populations, confirming the discrepancies in vaccination efforts. Measles is a causative factor for mortality in more than 95% of populations with low per capita incomes compounded by inadequate health care surveillance systems. Measles outbreaks can be particularly deadly in countries like Nepal and others in the SEARO that are either actively fighting or recovering from public health burden due to COVID-19. Overcrowding in residential camps significantly raises the risk of infection, and damage to health facilities and services interrupts regular immunization in Nepal.^[17]

STEPS FORWARD AND GLOBAL INVOLVEMENT TO PROMOTE MEASLES VACCINATION EFFORTS

As recommended by Acharya *et al.*, direct intervention for the most disadvantaged people is a critical strategy to reach universal immunization coverage and to reach vaccination targets by 2023. Southeast Asian policy-makers must be strategic in tackling social and economic disparities in immunization by placing disadvantaged families at the forefront of health intervention designs, which could minimize the frequency of VPD mortality and morbidity in the pediatric population.^[15] The underreporting of measles and rubella infections, as well as collective awareness of the significance of attaining and sustaining high population immunity to eliminate and prevent measles and rubella transmission, is a key to avoiding disease transmission

when the vaccine is due but cannot be administered during pandemics.^[18] For specific VPDs, WHO-coordinated surveillance networks have been developed to assist Ministries of Health and surveillance sites.^[19] The WHO Immunization Preventable Diseases collect data on a weekly, nil, and monthly basis for diseases such as acute flaccid paralysis, measles-like infections, maternal and neonatal tetanus, and acute encephalitis syndrome. Timely surveillance is critical for monitoring and eradicating measles and rubella. Early detection of outbreaks, the study of ongoing transmission, and estimation of true occurrence based on patterns in recorded data are all possible with surveillance. The WHO Member States report measles and rubella cases identified through national disease surveillance systems monthly. However, since both suspected and confirmed cases are underreported, the true number of cases that occur in the population remains uncertain.

The unspecified suspension of routine immunization is an indefinite solution to the COVID-19 pandemic, however, the possible risks of restoring immunization are far lower than contracting measles. To ensure that the pandemic-induced impact is reduced in the upcoming years, regional and international intervention is vital through means of updated yearly goals and provision of more vaccines in Nepal. WHO has planned to safely reinstate the vaccination program by maintaining social distancing; in addition, the joint brief intends to conduct immunization services, screen children for the detection of “fever and dry cough” before vaccination, manage personal protection for the safety of health care workers, provide immunization to all targeted (15 months and below) children, and last inform and coordinate immunization services to the local administration in Nepal.^[13] Moving forward, these efforts are likely to contain the resurgence of measles in Nepal and neighboring Southeast Asian countries.

CONCLUSIONS

Outbreaks of VPD cases such as measles, which are otherwise considered low priority for public health contingency plans, have been on the rise since the onset of the COVID-19 pandemic. The fears and stigmas associated with contracting SARS-CoV-2 may be causative in reduced measles vaccination in Nepal and across Southeast Asia, which have contributed to an increased incidence during February and March 2020. The unvaccinated pediatric population is more vulnerable to diseases like measles, as compared to the pre-pandemic vaccinated group, once social distancing and lockdowns are lifted in Nepal. We speculate that during and post the COVID-19 pandemic; the measles endemic is imminent, particularly due to socioeconomic

gaps and unhygienic measures. By maintaining social distancing and hygiene practices in Nepal, in accordance with COVID-19 safety guidelines, and using mitigating factors, a priority set immunization may be the public health response in the prevention of future measles outbreaks.

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