



Photo: internet

Immunization backlogs: The effects of COVID-19 pandemic on child vaccination in Bangladesh using Households Surveys

Over the past decades, Bangladesh has achieved remarkable progress in several health indicators and outcomes. Among the health indicators, high vaccination coverage, achieved through the successful implementation of the Expanded Program on Immunization (EPI), is noteworthy. It has facilitated the rapid reduction in child morbidity and mortality in Bangladesh.

During COVID-19 pandemic, the lockdowns, social or physical distancing, and other precautionary measures disrupt the child vaccination program, posing a risk of a possible upsurge in otherwise vaccine-preventable diseases.

To understand the possible effects of COVID-19 on the uptake of prescribed vaccines, in May 2020, BRAC James P Grant School of Public Health surveyed 389 women who gave birth between June 2019 and February 2020. The respondents were drawn from a list of women workers of a large semi-formal manufacturer. The survey was conducted over the phone ensuring all the ethical standards.

The mean age of the mother is 27.3 years with a standard deviation of 4.5 years. About 27 and 67 percent of the mothers have educational qualifications of respectively primary and above-primary levels. About 47.6 percent of the mothers reported being married before turning 18.

About 30 percent of the deliveries were conducted at home; whereas, about 36 percent of the deliveries were conducted at a private healthcare facility, and the remaining were conducted in different government facilities. Surprisingly, about 54 percent of respondents have had caesarian sections during the last deliveries.

Key messages

- We explore whether COVID-19 pandemic delayed child immunization in Bangladesh using household survey data.
- We look at a sample of 389 children who were born between June 2019 and March 2020. We define the children born before December 2019 as a less exposed to pandemic cohort, as they should receive the first batches of vaccines (namely, BCG, and the first doses of OPV, PCV, and Pentavalent) before the pandemic hit Bangladesh. We define the rest as a more exposed group as immunization dates of these children overlapped with the “lockdown” phase.
- We find delays in vaccinations when the children are more exposed to pandemic in the sense when their vaccine dates are more likely to fall after March 25, 2020, the day when the country went into an effective lockdown.
- In this study, we can only speculate that these delays are probably results of both demand-side and supply-side factors. However, there should be a greater recognition to ensure continuity in primary routine health care of Bangladeshi citizens, such as EPI, as failure to do so can impose higher health and economic costs in the long run.

We used a time-to-immunization analysis. We stratified the children into two cohorts, children born before December 1, 2019 in our sample and children born after that. We stipulated the children born earlier will be less exposed to the pandemic as the dates for the first vaccines will be before the pandemic outbreak in Bangladesh (the “less exposed” group). On the other hand, the immunization of the children born later are more likely to be affected by the pandemic (the “more exposed” group).

This poses a methodological challenge because we observe the children born earlier for a longer period and they have more time to get the vaccines. The children born later have a shorter window and we need to take this into consideration when we analyze the data. Just a simple binary outcome of whether the children received vaccines or not does not apply here.

Hence, for both groups, we follow the children from their births until they receive the immunization or when they are surveyed, whichever comes first. If they are NOT immunized, we consider this observation as right-censored, according to standard parlance of survival analyses.

We use March 25 as the date after which the vaccination program will be affected by the COVID-19 pandemic. The government announced a general holiday which stepped the county into a “lockdown” with varied effectiveness. However, many studies, including the rapid surveys carried out by BRAC JPGSPH suggest

the economic activities effectively stopped after March 25 which remained effective until June 1, when the “lockdown” was lifted and a more targeted zoning policy was introduced.

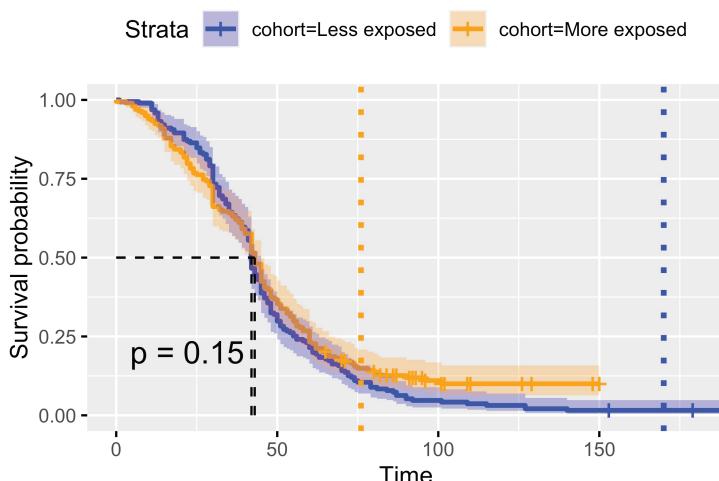
The days until which the “lockdown” potentially affected the immunization varied by the two cohorts - more and less exposed. The children who were born before December 2019 effectively had 170 days ($SD = 31$ days) before being exposed to the pandemic and children born on or after December 1, 2019 had 76 days ($SD = 25$ days) before being exposed. We use these cutoff days to identify the impacts of the pandemic on vaccinations.

We show the main results in Figure 1. The “less exposed” group face the adverse shock after 170 days after birth, and by this time almost all children receive the first batch of vaccines namely BCG and the first doses of oral polio, PCV, and pentavalent. The children in the more exposed group face the adverse shock after 76 days.

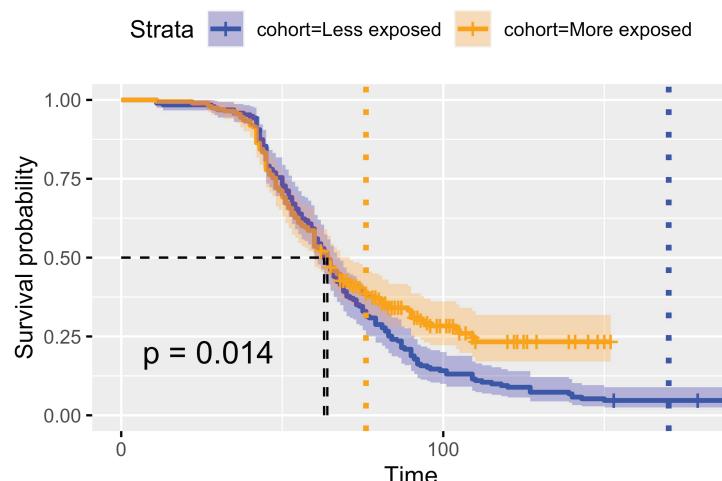
We show the survival curves for all four of these doses. The survival curves here basically show the fraction of babies who are yet to receive immunization. Interestingly, we see the divergence in the two survival curves only at or around the time when the “more exposed” group receives the pandemic shock. A lesser number of babies start receiving the vaccines, suggesting a longer time-to-immunization.

Figure 1: Time-to-Immunization Curves for Different Vaccines

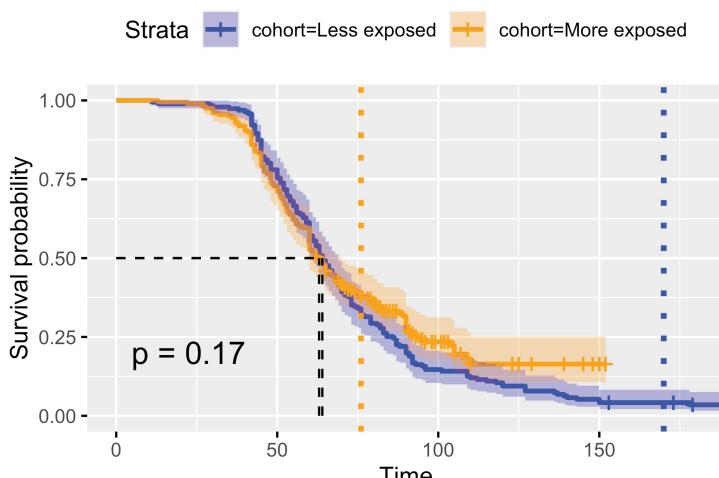
A: BCG



B: OPV-1



C: PCV-1



D: Penta-1

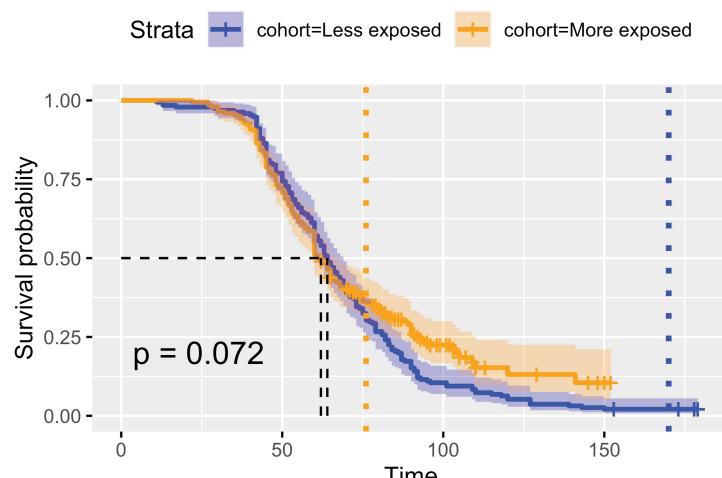
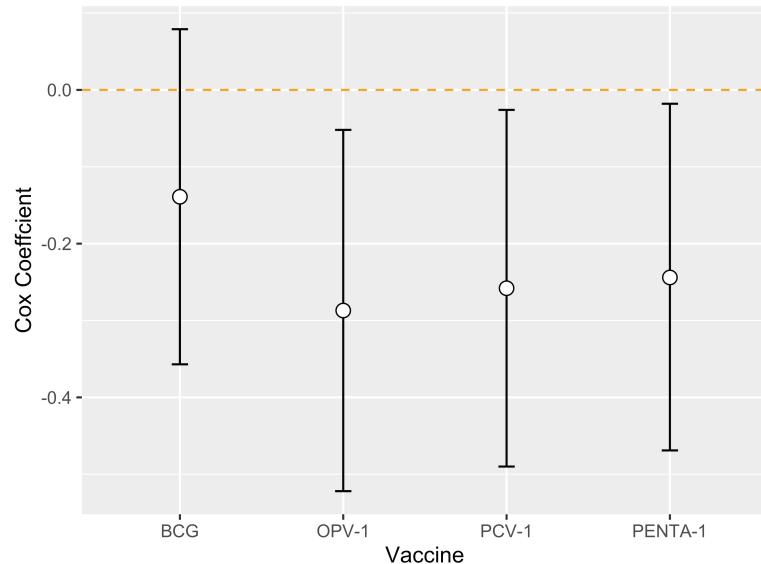


Figure 2: Multivariable Analyses



We further carry out some multi-variable analyses, where we control for some of the background variables which can potentially confound these results, even though we could not really think of any variable that would correlate with the timing of births. We show the results in figure 2. The hazard coefficients suggest lower incidence rates for the more exposed group for all vaccines and all are statistically significant except for BCG (which a child can receive right after birth).

These results are preliminary and suggestive. However, they indicate that the COVID-19 pandemic can potentially delay children receiving vaccines on time. This is particularly true for children whose vaccine dates are affected by the pandemic.

We can only speculate the exact mechanisms here. This can be demand driven as households may decide to delay the immunization date to avert exposure to the COVID-19 infections. This can also be because of the disruption in the vaccine supply chain as both traveling and keeping facilities open are more challenging during pandemic.

Regardless of the exact mechanisms, we believe this issue requires special attention. There will be implementation challenges to continue the immunization program during COVID-19 pandemic. It is possible that certain areas will fall into red zones over the coming months and EPI in such areas will face disruptions resulting in the immunization backlog we have found here. All relevant stakeholders, namely the government, private development sector, community health infrastructure, and the development partners need to come together more not to lose sight over our immunization program. Failing to do so can inflict further costs on our health system in the long run.

Prepared by

Atonu Rabbani and M Nazmul Islam.

Research assisted by Mushfiqur Rahman and Ribaiya Riya Siddiqua.

Language edited by Ahona Shirin.

The data used for this brief was collected as a part of the ongoing rapid surveys administered by BRAC James P Grant School of Public Health, BRAC University.