Estimating the effect of COVID-19 on total utilization of health services in Bangladesh

The COVID-19 pandemic has led to widespread stay-at-home orders, fears of going to health facilities where COVID-19 patients are treated, economic hardship due to job loss or interruption, and a variety of other changes that pose significant challenges to patient access and use of other health services. It is important to understand whether and how pandemics such as COVID-19 affect the utilization of essential health services so that policy and decision-makers can better plan and adapt programs as needed in the face of pandemics.

Using information available through routine health information systems (RHIS), Data for Impact (D4I) conducted a study to examine the effects of COVID-19 on the utilization of health services in Bangladesh. The study sought to examine patterns in use of selected non-COVID-19-related health services, including maternal and child health (MCH), family planning (FP), outpatient visits, and immunizations, before and during the COVID-19 pandemic in Bangladesh. D4I researchers used routine data from the pre-pandemic period to develop a model to predict total health service utilization over time, including estimating what the levels of health service utilization would have been in the absence of COVID-19.

Methodological approach: Time trend model

The study sought to investigate two key questions:

1) Did COVID-19 affect reporting of health service delivery activities over time?
2) Did COVID-19 affect the utilization of basic health services?

For the first question, the team examined the number of upazilas reporting to the Management Information System (MIS) 3 of the Directorate General of Family Planning (DGFP) and the number of upazilas reporting to the Expanded Program on Immunization (EPI) system over time. For the second question, the team examined the trajectory of health service use over time divided into two periods: January 2017 to February 2020 (pre-COVID-19 months) and March to August/September 2020 (COVID-19 months). Using this data, the team estimated a time trend model to replicate the trajectory of total health service use in the pre-COVID-19 period and used the model to predict what the total levels of health service utilization would have been during the COVID-19 months. The time trend model of service use closely replicated the reported levels of service utilization for the selected services during the pre-COVID-19 period, adjusting for seasonality and yearly changes.

The model, therefore, estimates the total levels of health service utilization for the three years prior to COVID-19 (up to February 2020) and predicts what those levels would have been had COVID-19 not occurred from March 2020 onward. The model's predicted service utilization levels from March 2020 onward are then compared to the reported actual service utilization during that same time period. The difference is the "COVID-19 effect" (COVID-19 effect = reported use [with COVID-19] – predicted use [without COVID-19]).

Data sources and health services examined

Data sources included the DGFP MIS 3 form that records monthly basic health service utilization at the upazila level, with national coverage (489 upazilas). MIS 3 data from January 2017 to August 2020 (a period of 44 months) were analyzed. Data from the EPI included monthly reported data from health facilities and EPI sites/satellite clinics in rural areas and NGOs in urban areas who provided immunization services at the upazila health complex level and affiliated outreach sites, with national coverage (424 sites). EPI data from January 2017 to September 2020 (a period of 45 months) were analyzed.

The MIS 3 form was used to examine MCH, FP, and outpatient services indicators; specifically, antenatal

care (ANC) 1-ANC 4 visits, postnatal care (PNC) 1-PNC 4 visits, facility birth deliveries, active management of the third stage of labor (AMTSL), FP service visits, and female and male outpatient visits. EPI indicators included the number of vaccinations for tuberculosis (Bacille Calmette-Guérin [BCG]), measles and rubella (MR) 1-2, and Pentavalent (Penta) 1-3. Reported numbers of each indicator were totaled within each time point across all reporting upazilas.

Covid-19 in Bangladesh

The first COVID-19 case in Bangladesh was confirmed on March 8, 2020 and the first death due to COVID-19 on March 18, 2020. The Government of Bangladesh declared a 10-day nationwide shutdown of businesses and offices on March 26, 2020, which was extended to May 30, 2020. Educational institutions were closed on March 16, 2020; in-person classes and standardized school examinations have been suspended to date.

Results

Did COVID-19 affect reporting of health services?

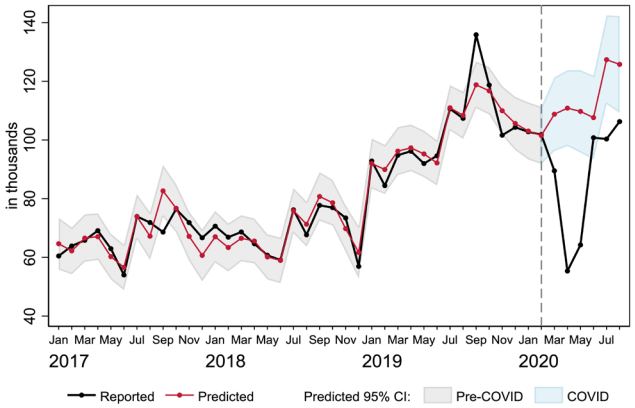
Initially, the number of upazilas reporting MIS 3 indicators varied over time, but all upazilas started reporting after the implementation of the updated MIS 3 form in January 2019. The number of upazilas reporting MIS 3 indicators was not affected during the COVID-19 months (March–August 2020), with all upazilas continuing to report all indicators. Before March 2020, the number of upazila health complexes reporting EPI indicators also remained fairly stable over time, except MR2. During the COVID-19 months, the number of upazila health complexes reporting BCG and Penta3 indicators decreased by 5.9% between March and May 2020. There were no observed decreases in EPI indicator reporting from June through September 2020.

Did COVID-19 have an effect on utilization of health services?

Antenatal care (ANC)

The total number of reported ANC 1-4 visits during the COVID-19 months (March to August 2020) were below the predicted levels of ANC 1-4 visits. Visits for ANC 1-4 showed a sharp decrease in March and April 2020. For example, ANC 1 dropped by 50%, as shown in Figure 1. ANC services showed an increasing trend during May–August 2020. However, the total number of reported ANC 1-4 visits remained significantly lower than the predicted levels during all COVID-19 months (at a 5% level of significance).

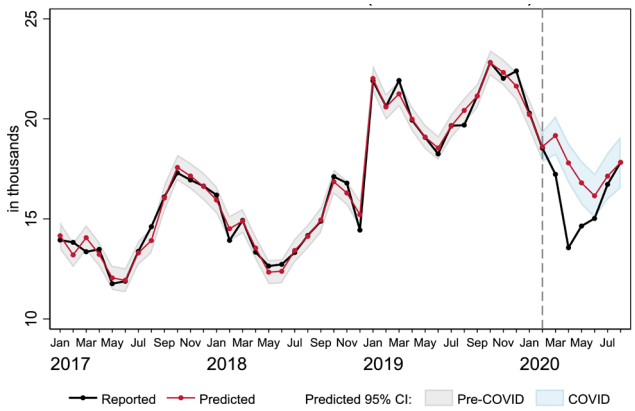
Figure 1. Reported and predicted total ANC 1 visits before and after COVID-19



Postnatal care (PNC)

The total number of reported PNC 1-4 visits was also below the predicted levels during the COVID-19 months. The total reported number for PNC 1 visits (i.e., within 24 hours of delivery) was 24% lower than the predicted levels of PNC 1 for April. PNC 1 visits, however, increased after April and recovered by July 2020 to within 95% confidence intervals of the predicted levels, as shown in Figure 2. Unlike PNC 1, the total reported PNC 2-4 visits (i.e., between 1 and 42+ days of delivery) continued to be significantly lower than the predicted levels throughout the COVID-19 months.

Figure 2. Reported and predicted total PNC 1 visits before and after COVID-19

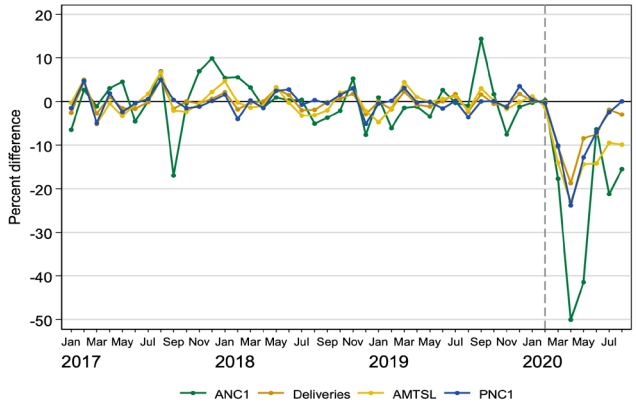


Facility deliveries and AMTSL

The total number of reported births at health facilities decreased between March and August 2020. The total number of births at health facilities was 19% lower than the predicted number of births for April (for AMSTL,

the total number of births was more than 20% lower than predicted levels for April). The total number of births at health facilities recovered from July (i.e., increased to within 95% confidence intervals of the predicted levels), but the reported AMSTL levels continued to be significantly lower than the predicted levels throughout the COVID-19 months. Figure 3 shows the "COVID-19 effect" for selected services, as described in the methods section.

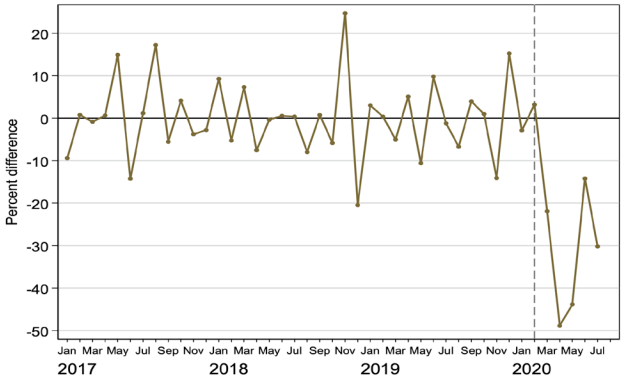
Figure 3. Gap between reported and predicted levels for selected maternal health services during 2017-2020



Family planning (FP)

The total number of reported FP visits was below predicted levels for March–July 2020, and was almost 50% lower in April. FP visits increased from May to July, but remained significantly below predicted levels for that time period (except for June, see Figure 4 for the "Covid-19 effect").

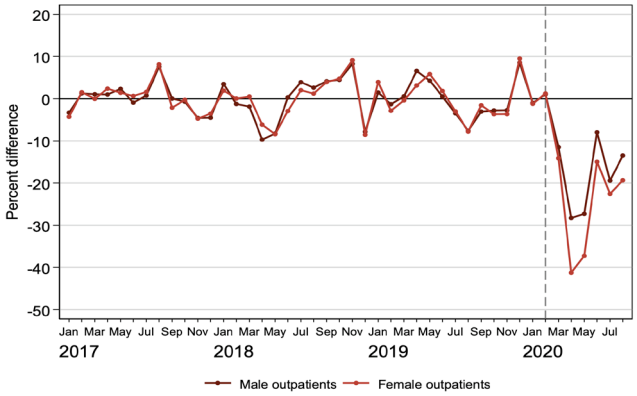
Figure 4. Gap between reported and predicted levels for total FP visits during 2017-2020



Outpatient services

The total number of reported male and female outpatient visits was 28% and 41% lower, respectively, than the predicted levels for April. The total number of reported outpatient visits for both the sexes remained significantly below predicted levels through August 2020, although they showed an increasing trend from May to August 2020 (see Figure 5).

Figure 5. Gap between reported and predicted levels for outpatient services during 2017-2020



Vaccinations: BCG for Tuberculosis

The total number of reported BCG vaccinations stayed within the predicted range in March 2020, but fell below predicted levels in April 2020. The total number of reported BCG vaccinations in April 2020 was more than 40% below predicted levels for April. By June 2020, however, the total number of reported BCG vaccinations was higher than predicted levels; thus appearing to recover from any COVID-19 effects on the number of BCG vaccinations (see Figure 6).

Vaccinations: Measles and Rubella (MR) 1-2

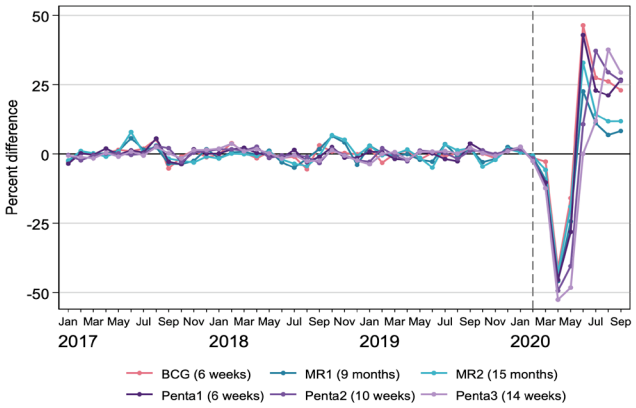
The total number of reported MR 1 vaccinations fell below predicted levels between March and May, with the most noticeable decrease in April 2020 when the total number of reported MR 1 vaccinations was 46% below predicted levels for April. MR 1 reported vaccinations recovered by June 2020, exceeding and/or within predicted levels for June through September 2020. MR 2 vaccinations dipped below predicted levels in April and May 2020, but also recovered and exceeded predicted numbers for MR 2 vaccinations by June through September 2020 (see Figure 6).

Vaccinations: Pentavalent 1-3

The total number of reported vaccinations for Penta1-3 fell below predicted levels from March to May, with the greatest decrease seen in the reported number of Penta 3

vaccinations in April 2020, which were 53% lower than the predicted levels for April. However, the total number of reported Penta 1-3 vaccinations recovered and exceeded pre-pandemic predicted levels by July 2020 (see Figure 6).

Figure 6. Gap between reported and predicted levels for childhood vaccination services during 2019-2020



Summary

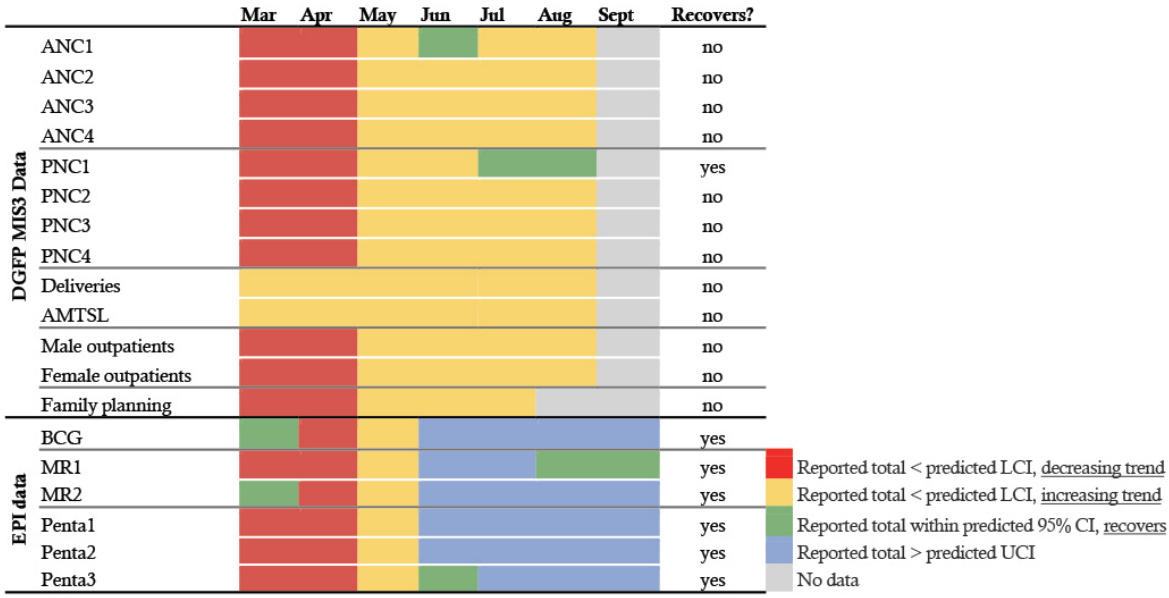
COVID-19 had a statistically significant negative effect on the utilization of maternal health, FP, outpatient, and childhood vaccination services in Bangladesh. The declines in national service use totals were most pronounced between March and May 2020, during the height of the lockdown period. Vaccination services were the first to recover and exceeded pre-pandemic estimate levels by July 2020. Table 1 summarizes the comparisons of the reported and predicted national totals for select health services during the COVID-19 months.

The time trend model was developed using data from the RHIS in Bangladesh and closely replicated the levels of service utilization during the 38 months prior to the COVID-19 pandemic. We used this model to predict the levels of service use that would have occurred in the absence of COVID-19 during the COVID-19 months (March–Aug./Sept. 2020), thus resulting in the ability to better understand the magnitude and pattern of the COVID-19 effect on utilization of select health services.

For more information:

D4I supports countries to realize the power of data as actionable evidence that can improve programs, policies, and—ultimately—health outcomes. We strengthen the technical and organizational capacity of local partners to collect, analyze, and use data to support their move to self-reliance. For more information, please visit https://www.data4impactproject.org/

Table 1. Summary: Comparing reported and predicted national totals and trends during COVID-19 month



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