

The effect of COVID-19 pandemic on routine childhood immunization coverage and timeliness in Tamale Metropolis, Ghana

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Introduction

- The emergence of the Corona Virus Disease 2019 (COVID-19) caused significant disruptions, delays, re-organization, or complete suspension of life-saving routine immunization services:
 - Reduced clinic visits for routine vaccination services for fear of contracting the COVID-19 virus.
 - Cancellation of planned outreaches.
- Funding and attention drifted towards COVID-19 vaccination:
 - Shift of focus by health workers towards COVID-19 vaccination, thereby, threatening the smooth running of routine immunization services.
- Tamale Metropolis was hardest hit during the COVID-19 outbreak in the Northern Region leading to:
 - Cancellation of planned outreach sessions
 - Shift of focus to COVID-19, making financing of routine immunization services difficult.
- Given the potential impact of the COVID-19 pandemic on immunization activities, it is crucial to assess changes in routine immunization coverages to inform catch-up strategies and the risk for the re-emergence of vaccine preventable diseases with limited control following the COVID-19 pandemic.

Objective

- To investigate the effect of COVID-19 pandemic on the coverage of routine childhood immunization and timeliness through December 2022

Methods

Design: We conducted a community-based cross-sectional pre- and post-pandemic cluster design survey of children under five years in Tamale Metropolis between December 2022 and January 2023.

Sampling: A total sample of 1512 caregivers of children under five years were estimated using the WHO sample size calculator for survey version 2 using the following assumptions: 95% coverage for all basic immunizations (Northern Regional target), a precision of $\pm 5\%$ (95% confidence interval), a design effect (DEFF) of 2, assumption of a minimum of 5 children per cluster, an intra-cluster correlation coefficient (ICC) of 1/3, assuming that 10% of eligible respondents will not be available or will decline the survey and that we would need to visit 4 households to identify an eligible child. Multi-stage sampling technique was used to select eligible respondents.

Household coverage survey: Immunization coverage was estimated using history and/or immunization card. Children who were eligible for vaccine before 12th March 2020 (the date of the first confirmed COVID-19 case in Ghana) were defined as the pre-pandemic birth cohort, those who were eligible for vaccine from 12th March 2020 to 11th March 2021 were defined as the pandemic birth cohort and those eligible for vaccine from 12th March 2021 to 17th December 2022 were defined as post-pandemic birth cohort. Timeliness of vaccine doses were defined as too early (given <28 days interval), timely (28 days), <2 months late, 2+ months late and timing unknown using dates ensuing vaccine doses were received or given.

The survey estimated coverages and timeliness for the following vaccines-BCG, OPV1, OPV2, OPV3, Penta1, Penta2, penta3, PCV1, PCV2, PCV3, Rota1, Rota2, Rota3, IPV, MR1, MR2, MenA. Children were considered fully immunized if they received BCG, OPV1, OPV2, OPV3, Penta1, Penta2, penta3, PCV1, PCV2, PCV3, Rota1, Rota2, Rota3, IPV, MR1. Unvaccinated was defined as those who did not receive BCG, OPV1, OPV2, OPV3, Penta1, Penta2, penta3, PCV1, PCV2, PCV3, Rota1, Rota2, Rota3, IPV, MR1.

Data analysis: Data was extracted from Kobocollect application into excel, cleaned, and imported in Stata version 15.1 (Windows Version). Analysis was performed using Vaccination Quality Indicators (VCQI), a set of Stata programs recommended by WHO for analyzing vaccination coverages.

Results

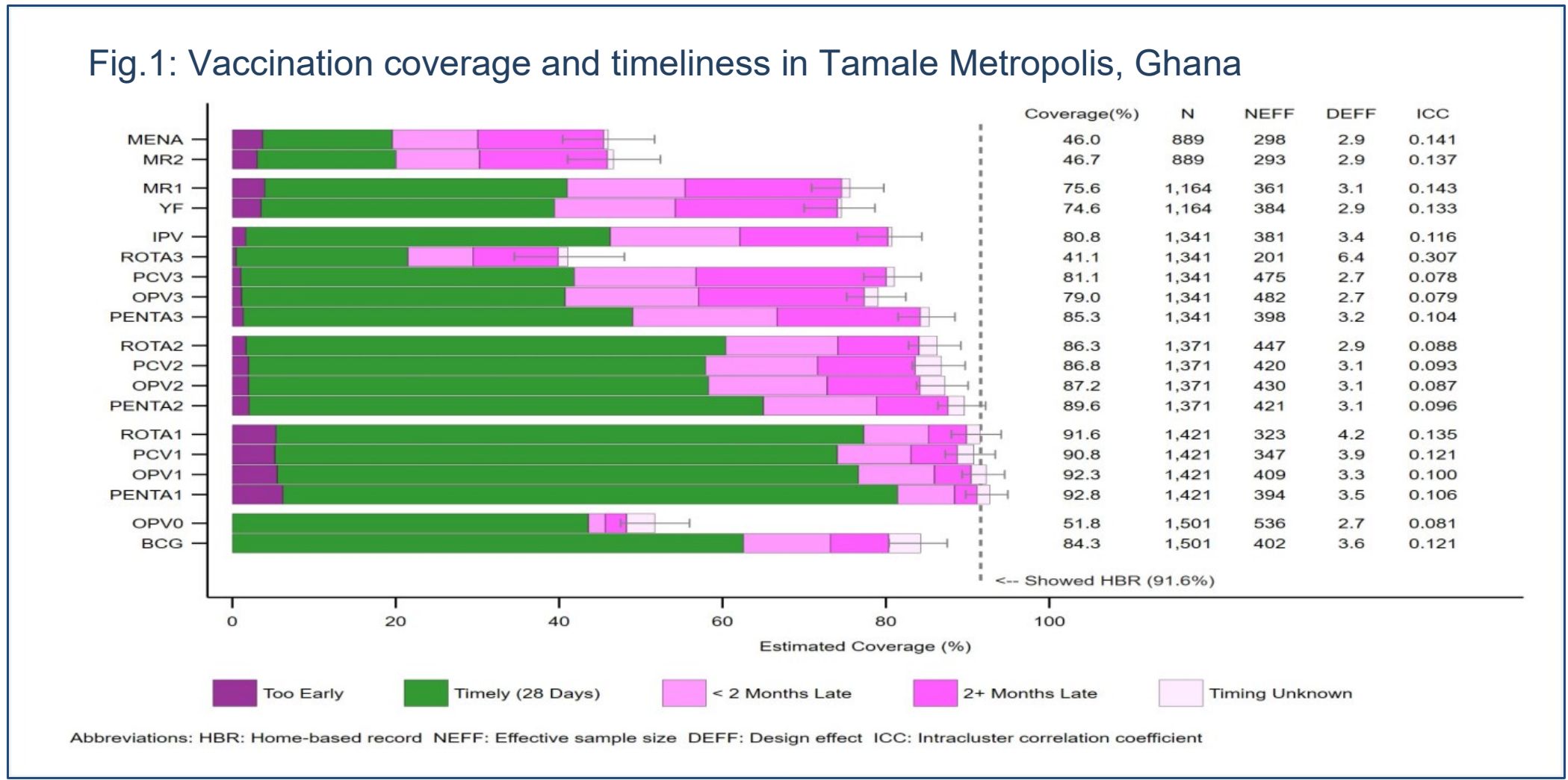
Vaccination coverage

Overall, immunization coverage was lower in COVID-19 affected birth cohorts compared with the unaffected birth cohort. Coverage of vaccine doses received in later age saw a greater decline across the COVID-19 affected birth cohorts. For the birth doses, the COVID-19 pandemic had no effect on BCG coverages. However, in the pandemic and post-pandemic birth cohorts, there was a decline in valid OPV0 coverages; 37.3% and 41.3% respectively from the pre-pandemic coverage of 47.5% (Table 1). In terms of doses given at 4 weeks, Penta1 and OPV1 declined slightly with valid coverages of 91.1% and 90.3% respectively. For doses given at 10 weeks, Penta2 declined from 88.9% in the pre-pandemic year to 88.1% and 83.8% in pandemic and post-pandemic periods respectively. Similarly, PCV2 declined from 88.7% in the pre-pandemic period to 88.1% and 76.1% respectively in the pandemic and post-pandemic periods. Rota 2 also decreased from 84.9% in pre-pandemic period to 80.4% and 75.7% in the pandemic and post-pandemic periods. OPV2 declined from 88.1% in the pandemic period to 78.5% in the post-pandemic period (Table 1). Additionally, OPV3 declined from 79.3% in pre-pandemic period to 65.8% and 60.3% in the pandemic and post-pandemic periods respectively. Penta3 declined from 80% in pre-pandemic to 72.6 and 70.9% respectively. PCV3 decreased from 79.3% in pre-pandemic to 73.2% and 62.4% in pandemic and post-pandemic periods respectively. MR2 also decreased from 48.5% in pre-pandemic period to 43.5% and 25.8% in pandemic and post-pandemic periods. MenA valid coverage reduced from 47.1% in pre-pandemic to 43.8% and 19.5% in pandemic and post pandemic periods respectively (Table 1).

Timeliness of vaccinations

Timeliness of vaccinations

Though most of the vaccine doses were given timely (28days), a significant proportion of vaccines were given too early (<28 days) or late (>28 days) (Figure 1)



Conclusions

- The covid-19 pandemic had minimal to medium impact on vaccination coverages in Tamale Metropolis.
- A high proportion of vaccine doses were either given too early or too late (compared with the national guidelines).
- The Metropolitan Health Directorate should strengthen routine immunization efforts and conduct more supplemental catch-up immunization campaigns.

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