



Credit: Nadège Mazars / Save the Children

Martina and her son at the Sexual and Reproductive Health Unit. Colombia. January 18, 2021.*

Maternal and Newborn Health Service Disruption during COVID-19

A Literature Review

Acknowledgements

In 2021, the READY initiative and the London School of Hygiene and Tropical Medicine (LSHTM) conducted a literature review summarizing available evidence on the utilization of maternal and newborn services in low and middle income countries (LMICs) during COVID-19. The literature review summarized in this report was undertaken by LSHTM student, Dhikshitha Gokulakrishnan.

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Background: Current evidence from low- and middle-income countries (LMICs) shows that maternal and newborn mortality and morbidity is unacceptably high.¹ Women and newborns suffer from preventable causes and are unable to consistently access appropriate healthcare services. In many settings, the COVID-19 (SARS-CoV-2) pandemic has acutely overwhelmed health services, impacting the ability to provide routine maternal-newborn care.² Additionally, restrictions such as lockdowns have acutely altered the utilization of healthcare services.³

Study Objectives:

1. Conduct a review of the existing literature focussing on the disruption in provision and utilization of maternal and neonatal services during COVID-19 in LMICs
2. Collate and summarize the results of all relevant, peer-reviewed studies

Study Methods: A systematic literature review was conducted using four databases: (1) Embase Classic+Embase (2) Global Health (3) MEDLINE (4) Web of Science. Databases were searched for studies focussing on maternal and newborn service provision and utilization during the COVID-19 pandemic in LMICs. Data was collected over an 8 week period between June and August 2021. Search terms included variations of terms for maternal and newborn health services, coronavirus, and low- and middle-income countries. Predetermined inclusion and exclusion criteria are shown in Table 1.

Table 1: Inclusion and exclusion criteria	
Inclusion criteria	Exclusion criteria
Studies based in LMIC	Studies based in high-income country
Published after December 1, 2019	Published before December 1, 2019
Articles with primary data	Descriptive articles
Studies focused on maternal and/or newborn health services	Studies focused on maternal and/or newborn outcomes (e.g. mortality)
Studies focusing on COVID-19	Studies not related to COVID-19
Quantitative outcome measures	Qualitative/mixed method outcome measures
Peer-reviewed studies	Non-peer-reviewed studies
Published in English	Published in languages other than English

Included studies were appraised for quality using the Newcastle-Ottawa Scale (NOS), a scale that is used for assessing the quality of non-randomized studies. Study findings were summarized for trends in service delivery and utilization across nine categories: (1) antenatal care (ANC), (2) postnatal care (PNC), (3) institutional births, (4) caesarean section (C-section) delivery, (5) obstetric emergencies, (6) breastfeeding (BF) advice, (7) maternal and neonatal inpatient and neonatal intensive care unit (NICU)

admission, (8) immunization services, and (9) staff shortages. A meta-analysis was not performed, due to the heterogeneity of findings and settings.

Key Findings: A total of 1,272 records were identified in the search. After duplicates, 778 abstracts were screened (the remaining 494 were duplicative), and 21 studies were selected for inclusion (see Annex 1). Following initial screening using the NOS, no studies met the criteria for “high quality,” 3 studies met the criteria for “moderate quality,” and 18 met the criteria for “low quality” (the mean NOS score for all included studies was 3.95). Due to the dearth of available literature, included studies were from a small range of countries. Key findings include:

- (1) ANC: Thirteen studies investigated the impact of COVID-19 on ANC provision and utilization. All studies investigating ANC reported a decrease in utilization during COVID-19, compared to a pre-COVID-19 time period. The ANC utilization percentage decreased during COVID-19, ranging from 2.4% to 69.6%,⁴⁻¹⁶ with the largest significant decrease having been seen in one single center study in India.
- (2) PNC: Four studies explored the impact of COVID-19 on PNC provision and utilization. PNC utilization decreased in all four studies, with the drop in service utilization ranging from 3.7% to 29.1%.^{8,12,15,17}
- (3) Institutional births: Nine studies looked at the number of institutional births during COVID-19. Significant decreases in institutional birth rates were seen in Nigeria, Mali, Sierra Leone, Malawi, India, Ethiopia, and Nepal. The largest significant decrease in institutional deliveries was 45.1%, a decrease that was observed in a single center in India. This data was collected from April 1st to August 31st, 2020, during the first wave of the pandemic. However, another Indian multi-center regional study only showed a 2.26% decrease and focused on a similar period of time (from March to June 2020).^{7,8,10,12,17-20}
- (4) C-sections: Five studies investigated changes in c-section provision during COVID-19. In Ethiopia,²¹ India,²² Nepal,²³ and Ghana,²⁴ an increase in c-section provision and utilization during COVID-19 was observed. A study based in China²⁵ revealed that living areas with higher COVID-19 cases were statistically associated with C-section deliveries.
- (5) Obstetric emergencies: Four studies explored the number of obstetric emergencies during COVID-19. A 66.4% reduction was seen in the number of obstetric emergencies in secondary care in India²² (statistical significance was not reported). Conversely, in Ethiopia,²¹ a 4.6% significant increase in maternal intensive care unit admissions was noted during COVID-19.
- (6) BF advice: Two studies explored the use of BF services (including advice). In Nepal, early initiation of BF (within one hour of birth) significantly decreased by 3.5% during COVID-19. A study based in Indonesia²⁶ revealed that only 33% of midwives initiated early breastfeeding regardless of COVID-19 status. However, there was no pre-pandemic proportion given to compare this finding.
- (7) Maternal and neonatal inpatient and NICU admission: In-patient care for ANC and PNC women and newborns (including NICU admission) was investigated in eight studies, aiming to identify changes in provision and utilization of care. The provision of NICU care significantly decreased by 24.1% in China²⁷ and by 50% in Ghana.²⁴ A regional, provincial study in China²⁸ found that there was a 27.01% increase in pregnancy-related diseases (e.g. pre-eclampsia). In India,²⁹ a decrease in maternal admissions was reported in two studies, while three studies investigated the utilization of immunization services for neonates.

- (8) Immunization services: Three studies investigated the utilization of immunization services for neonates. Reductions in newborn immunization uptake was seen in Rwanda,²¹ Ethiopia,³⁰ and India.³¹ The decrease in newborn immunization ranged from 12.24% to 28.5%.
- (9) Staff shortages: Staff shortages during COVID 19 were reported in three studies. In Ethiopia, 5.9% of pregnant women reported missing an ANC appointment due to the deployment of maternal health workers to COVID-19 areas.³² Results from multiple LMICs reported a shortage of neonatal staff throughout the pandemic.³³ For example, in Nepal, staffing levels in the labor room decreased from 6.2 health workers per 24 hours to 5.4 health workers per 24 hours.³⁴

Limitations: Only studies conducted in English were included in the literature review. This language restriction created a barrier to including data from many LMICs, as they may not have been easily found in English-language databases. The fluid and changing nature of the pandemic meant that the timing of infection surges impacted countries' desire for research and publications. For example, early national lockdowns and periods of low transmission led to delayed waves of COVID-19 in some countries, such as India. It is not clear if outcomes differed depending on periods of low transmission when compared to high transmission.

Conclusions: The recent pandemic has posed an unprecedented challenge to individuals, society, and healthcare systems. This review's findings show major disruptions and changes in patterns of utilization and provision of maternal and neonatal services due to COVID-19. It is not yet clear what the impacts will be on maternal and newborn mortality and morbidity but, given experiences in past infectious disease epidemic situations (e.g. West Africa Ebola outbreak in 2014-2016), it is likely to be significant.

Recommendations: The provision of essential and routine care for pregnant and postnatal women and their newborns should be prioritized throughout the COVID-19 pandemic, as well as subsequent epidemics and pandemics that may occur. The reduction in services indicates that it is necessary to provide additional support and/or adaptations to services during outbreaks in order to maintain service availability and utilization. Many of the studies in this review utilized existing data from healthcare settings to compare the changes in utilization and provision of maternal and neonatal services. Long-term studies on service disruptions relating to maternal-newborn health are needed to understand the true impact of the pandemic on maternal and neonatal health.

Annex 1: Studies included in the literature review

Author(s)	Location	Study population	Study Design	Data collection period	
				Pandemic Group	Control Group
Abdul-Mumin et al, 2021 ²⁴	Ghana	Single center	Cross-sectional	March 1 to August 31, 2020	March 1 to August 31, 2019
Goyal et al, 2020 ¹⁰	India	Single center	Prospective observational	April 1 to August 31 2020	October 1, 2019 to February 21, 2020
Johariyah et al, 2020 ¹¹	Indonesia	National	Cross-sectional	April 25 to March 10, 2020	None
Kassie et al, 2020 ¹²	Ethiopia	Multi-center, Regional (South West Ethiopia)	Cross-sectional	March to June 2020	March to June 2019
KC et al, 2021 ³⁴	Nepal	Multi-center	Prospective Cohort	March to August 2020	March to August 2019
KC et al, 2020 ¹⁷	Nepal	Multi-center	Prospective observational	January 1 to March 20, 2020	March 21 to May 20, 2020
Klingenberg et al, 2021 ³¹	International (LMICs)	Global (Southeast Asia, Europe and Central Africa, Middle East, North Africa, and Sub-Saharan Africa)	Cross-sectional	May 27 and June 17, 2020	None
Moyer et al, 2020 ⁷	Ghana	National	Cross-sectional	July 8 to August 7, 2020	None
Muhaidat et al, 2020 ¹⁴	Jordan	National	Cross-sectional	April 2020	None
Qureshi et al, 2021 ³⁵	India	Single center	Retrospective observational	March to August 2020	March to August 2019
Sarkar et al, 2021 ⁶	India	Single center	Cross-sectional	March 23 to May 31, 2020	January 12 to March 22, 2020

Shakespeare et al, 2021 ¹⁶	Zimbabwe	Single Center	Cross-sectional	April to June 2020	January to March 2020
Shapira et al, 2021 ⁸	Sub-Saharan Africa (Cameroon, Democratic Republic of Congo, Liberia, Malawi, Mali, Nigeria, Sierra Leone and Somalia)	Multi-center	Interrupted time-series analysis	March to July 2020	January 2018 to February 2020
Singh et al, 2020 ²⁰	India	Multi-center Regional (Uttar Pradesh)	Comparative analysis	March to June 2020	March to June 2019
Tadesse, 2020 ⁴	Ethiopia	Multi-center	Cross-sectional	February 25 to August 30, 2020	None
Temesgen et al, 2021 ¹³	Ethiopia	Regional (West Shoa zone, central Ethiopia)	Cross-sectional	July 1 to July 30, 2020	None
Wanyana et al, 2021 ¹⁵	Rwanda	Multi-center	Cross-sectional	March and April 2020	March and April 2019
Yan et al, 2021 ²⁷	China	Multi-center	Cross-sectional	January 1 to April 30, 2020	January 1 to April 30, 2019
Yang et al, 2021 ⁹	China	Regional (Ningbo, Zhejiang province)	Interrupted time-series analysis	January 23 to September 6, 2020	January 1, 2017 to January 22, 2020
Zhang et al, 2020 ⁵	China	Multi-center	Cross-sectional	April to May, 2020	None

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- ⁴ Tadesse, E. (2020). Antenatal care service utilization of regnant women attending antenatal care in public hospitals during the COVID-19 pandemic period. *International Journal of Women's Health*, 12, 1181–1188.
- ⁵ Zhang, J., Zhang, Y., Ma, Y., Ke, Y., Huo, S., He, L., Luo, W., Li, J., & Zhao, A. (2020). The associated factors of cesarean section during COVID-19 pandemic: a cross-sectional study in nine cities of China. *Environmental Health & Preventive Medicine*, 25(1), 1–7.
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- ¹¹ Johariyah, Z., & Widyawati, M. (2020). How maternal and neonatal services at the community level during the COVID-19 pandemic in Indonesia? *Systematic Reviews in Pharmacy*, 11(11), 237–242.
- ¹² Kassie, A., Wale, A., & Yismaw, W. (2021). Impact of Coronavirus Diseases-2019 (COVID-19) on utilization and outcome of reproductive, maternal, and newborn health services at governmental health facilities in south west Ethiopia, 2020: comparative cross-sectional study. *International Journal of Women's Health*, 13, 479–88.
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