Supplementary file 4. Key findings from studies included in the review

<table>
<thead>
<tr>
<th>First author (year)</th>
<th>Key findings</th>
<th>Authors acknowledged limitations (if any)</th>
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</thead>
</table>
| Abdela¹ (2020)      | **Impact**   | - The study was conducted in a single hospital (lack of representativeness) and was not able to collect information on the reasons behind the decrease in patient flow.  
- Second, we were not able to collect information on the reasons behind the decrease in patient flow, and whether patients attended other healthcare facilities.  
- Almost all components of maternal and child health services suffered from a low case flow.  
- The exception was the delivery service, which was relatively stable.  
- The number of tests for the diagnosis of tuberculosis also decreased substantially. |
|                     |              | - The study was conducted in a single hospital (lack of representativeness) and was not able to collect information on the reasons behind the decrease in patient flow.  
- Second, we were not able to collect information on the reasons behind the decrease in patient flow, and whether patients attended other healthcare facilities.  
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- The exception was the delivery service, which was relatively stable.  
- The number of tests for the diagnosis of tuberculosis also decreased substantially. |
| Ahmed² (2020)       | **Preparedness** | - Mental health services and those addressing gender-based violence were perceived to be limited or unavailable.  
- **Impact**  
  - Pre-COVID-19, diagnostic and treatment services were available for slum dwellers, preventive services were well used.  
  - Stakeholders perceive a reduction in access to all healthcare services in slums during COVID-19 lockdowns, with inconsistent and inadequate attention given to ameliorating this.  
  - Access barriers include increased cost of healthcare, reduced household income, increased challenges in physically reaching healthcare facilities and exacerbated reluctance of residents to seek healthcare due to fear of infection and stigmatisation.  
  - Few health facilities were operating on reduced or minimal services where opening hours were limited, stocks of medicines and other supplies were compromised and staff numbers low (or sometimes none) as staff could not get to work due to the lockdown: “Outpatient services are reduced because not all members of staff are able to come to work. Our ambulance goes round to pick staff who live close by (Nigeria Site 3/Nurse/ Female)”  
- The report is the perspective of stakeholders who may not, for example, realise an apparently closed health facility is functioning by providing remote consulting or that what they experienced was transient as health services adapted to the lockdown.  
- The authors reached (i) those self-identifying as disabled and (ii) belonging to formally constituted youth groups in two research sites and are likely to have missed engaging with people from other vulnerable groups.  
- It is likely stakeholders were influenced by social desirability, their expectations of the research and researcher positionality.  
- The shift from face-to-face interactions to telephone calls reduced non-verbal cues which can be important in deepening the conversation. |
<table>
<thead>
<tr>
<th>Ammor(^1) (2020)</th>
<th>Impact</th>
<th>Response</th>
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<tbody>
<tr>
<td></td>
<td>A significant decrease in patients' admissions during the lockdown period at the different units of our centre.</td>
<td>Mobile consultation using phones for COVID-19 symptoms. A Kenyan health manager expressed: 'We have given out telephone numbers for the rapid response team to help with COVID-related cases. We also have a health facility telephone numbers for patients to call and talk to a health worker for non-communicable conditions that need monitoring. That way we can continue providing other services besides COVID-19 and ensure continuity of services.'</td>
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<tr>
<td></td>
<td>No healthcare professional was infected and only 8 patients showed symptoms of fever and cough, and all of them had a negative test for COVID-19 (RT-PCR) in the early stage of the pandemic.</td>
<td>Strong infection control measures were implemented all over the oncology and Hematology Centre (OHC) such as including a new sorting area dedicated to patient screening</td>
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<td>Not provided</td>
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### Bajaria (2020) Preparedness
- Allocating a special clinical unit to manage suspected COVID-19 cases
- Adapted schedules for healthcare workers and treatment administration.
- Screening/sorting zone
- A strict and safe triaging procedure was performed
- Suspected COVID-19 patients were isolated in a dedicated area, and later referred to COVID-19 facilities for further examinations.
- Surgical masks were provided for non-suspected patients
- Primary hygiene measures applied

### Barasa (2020) Preparedness
- Low health facility preparedness to comply with COVID-19 prevention measures in HIV services is low.
- Limited availability of some COVID-19 precaution products, such as medical masks, disinfectants, alcohol-based hand rub and access to running water, especially at publicly managed facilities and facilities in rural areas.
- Availability of medical masks at facilities in general was considerably low, especially at publicly managed facilities and facilities in rural areas.
- 64% of urban and 32.9% of rural health facilities had functioning communication systems.

- The data were collected five years ago and might not reflect the most current situation in some areas
- The study did not take into consideration the facility level or size, availability or readiness of some items
- The study was unable to obtain adequate number of health workforce available at each facility.

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64% of urban and 32.9% of rural health facilities had functioning communication systems.
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<tr>
<th>Author(s)</th>
<th>Year (Publication)</th>
<th>Impact</th>
<th>Notes</th>
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<tr>
<td>Bell (2020)</td>
<td>HIV/AIDS: New HIV case declined by 75% in the first 2 weeks of April, with a similar 75% reduction in the initiation of isoniazid-preventive therapy to prevent secondary tuberculosis. Malaria: Malaria showed a reduction in case detection in the first quarter of 2020. Admissions and inpatient deaths declined by similar proportions. Maternal mortality: A 29% (28,939) reduction in facility deliveries is recorded in the Ministry of Health Uganda data in March 2020</td>
<td>Understanding the extent of spread in the community through better testing will be important to understand whether the relatively low COVID-19 numbers recorded in African countries to date are due to late introduction, are an artifact of low testing, or are due to the low rate of severe presentations predicted here.</td>
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<td>Buonsenso (2020)</td>
<td>The vaccination rate dropped by 50–80% in 2020 compared to the previous year (p &lt; 0.0005). The number of children diagnosed with common childhood conditions (malaria, pneumonia, and diarrhoea), decreased but no increases in deaths were reported.</td>
<td>The study was a retrospective with a limited time period and collected absolute numbers only. No comprehensive epidemiological data (such as birth rates) were available.</td>
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<td>Burt (2021)</td>
<td>Antenatal care attendances decreased by 96% in April 2020 and remain below pre-COVID levels. Rise in adverse pregnancy outcomes for Caesarean sections (5%), haemorrhages related to pregnancy (51%), stillbirths (31%) and low birth weight (162%) and premature infant births (400%). Drop in neonatal unit admissions by 25%, immunisation clinic attendance and delivery of all vaccinations except measles. Drop in clinic attendance for prevention of mother to child transmission of HIV. An increase in childhood malnutrition clinic attendance (348%). Maternal and neonatal deaths, immediate post-natal care and contraceptive provision remained within normal limits.</td>
<td>Data collected retrospectively. Use of data from electronic medical records as opposed to direct patient records could have resulted in under-representation of the true values of each indicator.</td>
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<td>Debes (2021)</td>
<td>Only one third (33.6%) reported that they were prepared to provide direct clinical care to COVID-19 patients.</td>
<td>Not provided</td>
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<td>Deressa (2021)</td>
<td>Not provided</td>
<td>A possibility of selection bias and eligible participants might be excluded. Limited generalizability of the results and findings to other public and private hospitals.</td>
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- 93% wearing facemask (93%), 92.7% washed hands for at least 20 seconds (92.7%), 90.9% covering mouth and nose when coughing or sneezing, 90.5% avoiding touching eyes, nose, and mouth with unwashed hands.
- About 30% and 43% of the participants somewhat or strongly worried, respectively, that their personal health was at risk during the COVID-19 pandemic.
- About 38% and 50% of all respondents perceived that they were somewhat worried or extremely worried about themselves, respectively, due to the potential risk of becoming infected with coronavirus by their clinical role in the hospital setting.
- About 65% were extremely worried about the potential risk of infection to their family and loved ones.
- Average worry scores for the COVID-19 crisis were high, with a mean (±SD) of 28.4 (±5.9), ranging from 12 to 36.

**Desalegn**\(^1\)\(^1\)\(^\text{11}\) (2021)

**Preparedness**
- Half (50%) of the healthcare providers were not satisfied with the medical equipment available for COVID-19 treatment in their hospitals.
- Most of the health care workers were not optimally prepared to prevent the Covid-19 outbreak.
- The overall knowledge of the participating HCWs regarding signs and symptoms, identification of persons at risk of developing the disease, case definition of COVID-19, appropriate tests offered to suspected cases, and high-risk patients and preventive measures that help to minimise the risk of transmission was moderate.

**Gichuna**\(^2\)\(^2\)\(^\text{12}\) (2020)

**Impact**
- Various restrictions imposed by the government to help curb the spread of COVID-19 spared significantly impacted female sex workers to access sexual and reproductive health care services.
- Female sex workers felt stranded as there is no Bar Hostess Empowerment and Support Program clinic or a sex worker friendly facility within the Eastleigh area. One sex worker expressed her concern because she had been forced to go without pre-exposure prophylaxis while another could not get a refill of her ARVs: “I live in Eastleigh, and take my PrEP supplies from Jogoo Road clinic, with the lockdown, I have been forced to stop taking pre-exposure prophylaxis. (Sex worker, 26 years, Jogoo Rd)”
- Female sex worker reported a missed appointment “I have missed my appointments to the clinic at Bar Hostess Empowerment and Support Program. I was supposed to go collect my ARVs but now with the lockdown, how will I go to collect them? I

- The study focused on more general populations of HCPs like other studies who might have direct contact with COVID-19 patients.
- The results of this study might be affected by information bias since it was based on self-reported data using self-administered questionnaire.
- The respondents might overestimate or underestimate the responses in a way that they believe is socially acceptable rather than reporting actual or genuine answers.

- The study was a cross-sectional design, did not show cause and effect relationship
- The study was conducted in Addis Ababa, the capital city of Ethiopia, where people had good access to health-related information.

- Generalisability (the study included sex workers covered by Bar Hostess Empowerment and Support Program (BHESP) services only
cannot visit the public health facility because of stigma and discrimination. (Sex worker, 21 years, Jogoo Road)

- A nurse at Bar Hostess Empowerment and Support Program observed that due to the increased waiting time, some of the clients grow impatient and leave before they get the services while others feel they are being avoided or rejected: “We are wary of the dangers of contracting COVID-19 so we now allow only 5 clients at a time in the clinic. This has its downside because some when told to wait they get impatient and leave without the service. Some may feel like we do not want to attend to them and they go away complaining. (Nurse, BHESP)

- Limited access to some reproductive health commodities. “One of the main commodities we lack is family planning. During this time if we are not careful we will deliver a lot of ‘corona babies’. There is a problem with Norplant and the family planning injectables are also not available for continuing women. This is not good for us. (Sex Worker, 40 years, Kasarani)

- It was also observed in the disruption of supply for reproductive health commodities due to the focus on COVID-19 had led to a neglect of routine reproductive healthcare services especially in the public health centres. “For now, when you visit the public health facility, we cannot be given contraception, priority has been given to responding and attending to emergency cases. (Sex workers, 20 years, Jogoo Road)

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<th>Jensen(^1) (2020)</th>
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<td>Following the start of the COVID-19 outbreak, significant declines were seen for clinic attendance (36%; (p=0.001)) and hospital admissions (50%; (p = 0.005)) of children aged &lt;5 years and a 47% increase in neonatal facility deaths were reported. Overall, a significant disruption pattern was seen across multiple indicators for service access, service delivery and the wellbeing of children.</td>
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<th>Mohammed(^1) (2020)</th>
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<td>Tuberculosis cases detection rate has reduced considerably, and Directly Observed Therapy visits have been interrupted.</td>
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<td>Human and material resources for TB have been shifted to COVID19</td>
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<td>Some health facilities that have been providing TB care and treatment services have been committed as COVID-19 isolation and treatment centres.</td>
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- There might be potential inaccuracies in the District Health Information System (DHIS) data set
- The DHIS data only provide information about children presenting to healthcare facilities (i.e. some children in need of healthcare may have remained at home because of the COVID-19 outbreak
- Not provided
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Impact</th>
<th>Preparedness</th>
<th>Response</th>
<th>Health workforce</th>
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<tr>
<td>Odume (2020)</td>
<td>Impact</td>
<td>The COVID-19 epidemic has adversely impacted TB services in Nigeria. TB clinic attendance, presumptive TB identification, TB cases detection and treatment initiation significantly decreased since the onset of the COVID-19 (P &lt; 0.001).</td>
<td>• The study focused only on the trend in the TB cascade and did not explore other confounders to the declining trend through qualitative means.</td>
<td>• Some errors and omissions could occur during the data collection and transcription process.</td>
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<td>Otitololu (2020)</td>
<td>Preparedness</td>
<td>• While few countries such as Mauritius, Ghana, South Africa, Botswana, Tunisia and Cabo Verde had medium to higher ability to carry out COVID-19 testing, most African countries were low comparing their population.</td>
<td>• Analysis was based on available data over a 75-day period of observation only. The patterns and trends are still evolving and by the time the paper is published, significant changes could have occurred.</td>
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<td>Pierre (2020)</td>
<td>Impact</td>
<td>• Less than half (48%) HIV patients attended scheduled ART collection clinic appointments.</td>
<td>• As studies conducted in a single centre, findings may not be generalized to map the national context.</td>
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<td>Sagon-Teysse (2020)</td>
<td>Health workforce</td>
<td>• Following the Covid-19 outbreak, 72, 73, and 77% of participants reported depression, anxiety and insomnia symptoms, respectively. A lack of personal protection equipment and a shortage of health care professionals (especially nurses) were associated with a high risk of common mental health disorders among participants.</td>
<td>• The sample size was small</td>
<td>• The sample was not representative of the population of Malian HCW.</td>
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<td>Source</td>
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| Schwartz (2021) | - COVID-19 national lockdown adversely affects hypertension but not HIV services. This is due to the underdevelopment of integrated service delivery for other chronic conditions.  
  - Compared to the pre-lockdown period (0.4–5.2%), the percentage of missed appointments during lockdown for HIV and hypertension care ranged from 16.2%–21.5%.  
  - During lockdown, 49–66% of those who missed appointments sought care at other health facilities of which most sought services for HIV, not for hypertension. | Not provided |
| Semaan (2020) | - In all settings and across the continuum of care, participants saw fewer patients at facilities, due to transportation restrictions or fear of nosocomial transmission. A nurse-midwife from Kenya wrote, ‘accessing inpatient antenatal care [is] minimal. Women fear [getting] infected with COVID-19 if [they are] in hospitals. Most of them keep off from hospital even when they are sick’  
  - Participants in LMICs acknowledged that women’s inadequate access to communication infrastructure prevents equitable healthcare provision.  
  - Health workforce  
    - Only 15% of health providers reported that they clearly identified how to provide care for women with COVID-19  
    - 1/3 of respondents received training on COVID-19 from their health facility & nearly all searched for information themselves  
    - Less than half (47%) of healthcare providers in low-and middle-income countries received updated guidelines for care provision, which compared with 82% in high-income countries.  
    - Less than half (47%) of participants in low-and middle-income countries, and 69% in high-income countries felt mostly or completely knowledgeable in how to care for COVID-19 maternity patients  
    - Healthcare workers providing essential services to women and newborns during this pandemic experience increased levels of stress and anxiety. An obstetrician from Mozambique described, ‘My stress level is immeasurable. Every time a pregnant woman with flu-like symptoms [visits the health facility], I feel almost completely lost. I need to be equally protected and I don't feel any protection from whoever [is responsible of protecting me]’. | Not provided |
• Shortage of qualified staff, either because of symptoms, self-isolation after potential exposure, or inability to reach their workplace, as a midwife in Uganda described: ‘Transport to work is a big challenge due to lockdown; many staff live far away from the hospital. Staff who manage to come to work hurry to leave early to observe the curfew time of 7.00 p.m.’.

• Certain healthcare facilities relied on locum workers and students to fill staffing shortages. Some respondents requested more support from management as exhaustion increased. A department head in Uganda reported, ‘There are no more clear work schedules as I get to attend many unscheduled/emergency meetings. Staff are very anxious and panicky and need talking to all the time, which is exhausting’.

Response

• Variability in the facility-level response to COVID-19 between high-income countries and low-and middle-income countries (in terms of guidelines, setting-up signage and patient/visitor screening, testing availability, and dedicating isolation rooms for maternity patients with confirmed or suspected COVID-19.

• One third (32%) of health providers from LMICs reported that the availability of all three types of personal protection equipment items such as gloves, masks, and aprons, with reported availability ranges from 32% (aprons) to 70% (gloves).

• Lack of national guidelines to facilitate the provision of health services for pregnant women. An obstetrician/gynaecologist from Uganda expressed: ‘I am worried that no national guidelines [are] rolled out yet regarding care for pregnant women and newborns.

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<tr>
<th>Shikuku et al. 2020</th>
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<td><strong>There were no differences in monthly mean (±standard deviation) attendance between March-June 2019 vs 2020 for antenatal care, hospital births, family planning attendance, post-abortion care and pentavalent 1 immunisation.</strong></td>
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<td><strong>Reduction in the proportion of adolescents presenting with pregnancy among 10 – 14 years and 15 – 19 years from 0.4% to 0.3% (p&lt;0.0001) and 8.4% to 7.0% (p &lt; 0.0001) respectively from the pre-COVID-19 to the peri-COVID-19 period</strong></td>
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<td><strong>Reduction trends were observed for revisiting clients for antenatal care services (69.8% to 67.9%, p &lt; 0.0001)</strong></td>
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<td><strong>Reduction completing four antenatal care visits at the health facilities (18.6% to 17.0%, p &lt; 0.0001)</strong></td>
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• The use of DHIS2 data poses key data quality challenges including inaccurate and incomplete reporting that are prevalent in low and middle-income countries.

• The short period reviewed during the peri-COVID-19 pandemic represents the period when the burden of the pandemic was not at the peak in the country compared to the transmission trends as experienced in other European and American countries. Further evaluations at 6 and 12 months may be required to validate the outcomes.
• Increase in the new clients seeking antenatal care services at the health facilities during similar periods (30.2% to 32.1%, \( p < 0.0001 \)) but also a significant decrease in ANC revisits (69.8% to 67.9%, \( p < 0.001 \)).

• Mean monthly skilled birth attendance rate and caesarean section rates increased significantly from 68.5% (standard deviation \( \pm 2.0 \)) to 79.7% (SD\( \pm 1.2 \)) from the 4-month pre-COVID-19 to peri-COVID-19 period \( (p < 0.0001) \).

• There was a significant increase in the proportion of clients revisiting the hospitals for family planning services from 53.0% to 56.6% \( (p < 0.0001) \) from the pre-COVID-19 to the peri-COVID-19 period.

• There was a significant reduction was reported in the new clients seeking family planning services from 47.0% to 43.3% \( (p < 0.0001) \).

• There was a significant, although temporary, reduction in child healthcare visitation but general resilience of adult ambulatory care provision during the first 4 months of the lockdown.

• There was no change in total clinic visits/clinic/ day at the time of implementation of the level 5 lockdown, or at the transitions to less stringent level 4 and 3 lockdown levels.

• There was a >50% reduction in child healthcare visits at the start of the level 5 lockdown from 11.9 to 4.7 visits/day \((-7.1 \text{ visits/clinic/day, 95\%CI} -8.9 \text{ to 5.3})\), both for children aged <1 year and 1–5 years.

• There was no drop-in clinic visitation in adults at the start of the level five lockdown, or related to HIV care.

• The exposure of interest (i.e., the lockdown measures) were not randomly allocated, so there is a risk, however small, that a simultaneous exogenous shock could be responsible for the changes in clinic visitation seen.

• The dataset is purely quantitative and focused on clinic visitation events, which prevents deeper exploration of the root causes of trends noted.

• Another key potential limitation is that it is predicated on the assumption that there were no other external factors that would have caused interruptions to the healthcare system on or after 27 March 2020 (e.g., power outage, inclement weather).

References


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