An Integrative Literature Review on the Impact of COVID-19 on Maternal Health in Africa

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Abstract

Africa has the highest rates of maternal deaths globally which have been linked to poorly functioning health care systems. The aim of this paper is to review the published literature on the impact of the COVID-19 pandemic on maternal health in Africa. The integrative review process delineated by Whittemore and Knafl (2005) was used to meet the study aims. The literature search of Ovid Medline, CINAHL, PubMed, WHO, Google and Google scholar, Africa journals online, MIDIRS was limited to publications between March 2020 and May 2022. All the studies went through the PRISMA stages, and 179 full text papers screened for eligibility, 36 papers met inclusion criteria. Of the studies, 6 were qualitative, 25 quantitative studies, and 5 mixed methods. Thematic analysis according to the methods of Braun and Clark (2006) were used to synthesize the data. From the search the four themes that emerged include: effects of lockdown measures, COVID concerns and psychological stress, reduced attendance at antenatal care and childhood vaccination, reduced facility-based births and increase maternal mortality. A review of the literature revealed the following policy issues: The need for government to develop robust response mechanism to public health emergencies that negatively affect maternal health issues and devise health policies to mitigate negative effects of lockdown. In times of pandemic there is need to maintain special access for both antenatal care and child delivery services and limit a shift to use of untrained birth attendants to reduce maternal and neonatal deaths. These could be achieved by soliciting investments from various sectors to provide high-quality care that ensures sustainability to all layers of the population.

Key Messages

Preparedness and response support to countries with high maternal mortality rates will be critical now than ever to reduce the negative impact of the current global pandemic.

Healthcare systems need to be strengthened to prioritize maternal health services during and after the COVID-19 pandemic.

This could be achieved by soliciting investments from various sectors to provide quality care that ensures sustainability to all layers of the population.

Introduction

The specific effects of SARS-CoV-2 on maternal health include reduced accessibility to health care by women and children because of the competing needs for intensive health care services of corona virus diseases-2019 (COVID-19) patients; health care infrastructures, medical equipment, and deliverables became overstretched and inadequate to meet the needs of all patients with women and children particularly affected.

Throughout history, Africa has often faced epidemics resulting in many deaths, including Lassa fever, polio, measles, tuberculosis and human immunodeficiency virus and Ebola disease[1]. The latter was more notable in West Africa. SARS-CoV-2, commonly known as COVID-19, was first discovered in Wuhan China in December 2019 but spread globally with the first African case reported in Egypt on the 14th of February 2020.
By the end of first week of March 2020, other African countries including Algeria, Cameroon, Egypt, Morocco, Nigeria, Senegal, South Africa, Togo, and Tunisia recorded their first cases with most index cases originating from Europe[2]. The World Health Organisation (WHO) declared the virus a global pandemic on the 11th of March 2020. Countries developed various related strategies including lockdowns with stringent rules.

The vulnerability of the health care systems in Africa have been exposed by past pandemics, such as Ebola, Athenian plague, Black death, the Seven-Cholera Pandemic, Justinian plague, HIV/AIDS, and Swine flu. During these pandemics there was a decline in access to healthcare during pregnancy and childbirth leading to increased risk of maternal morbidity and mortality, which further weakened the health systems[3, 4, 5, 6, 7]. The global measures implemented by different countries to control the spread of COVID-19 has had adverse effects on citizens. Some studies reported that in Africa the COVID-19 outbreak caused disruption and decline in maternal health services such as antenatal care (ANC), delivery, post-natal care (PNC), family planning and vaccinations[8, 9, 10, 11, 12, 13, 14, 15] linked to barriers created by lack of personal protective equipment (PPE), shortage of human resources, long waiting times and others. Measures to overcome the situation caused disruptions in routine ANC as accessibility was difficult, lack of transport, increased poverty as breadwinners were jobless, informal jobs could not thrive among other impaired circumstances. These were impediments to pregnant women trying to access to health facilities[14, 16]. Above all, health facilities were occupied with the pandemic and its related diseases. During the first wave of the COVID-19, health facilities focused solely on COVID-19 to the exclusion of all other conditions Hence maternal health care (MHC) services uptake fell steadily during the pandemic[13]. This decline was reported in eight sub-Saharan African countries where countries experienced MHC service disruption for at least a month with the magnitude and durations differing among countries[12].

Even though COVID-19 pandemic is not gender selective, maternal health in Africa may have been particularly affected by these measures[4, 17]. Hence this integrative review aimed to assess the impact of COVID-19 on maternal health service in Africa.

**Methods**

**Methodology**

The integrative review process delineated by Whittemore and Knafl[18] was used to meet the study aims. Integrative reviews make use of not only quantitative and qualitative studies but survey and technical reports in the grey literature that may be pertinent[18]. The method of this review followed five phases: problem identification, literature search, data evaluation, data analysis, and presentation which is a display of the results in tables and figures.

**Search Strategy and selection procedure**

A search of Ovid Medline, CINAHL, PubMed, WHO, Google and Google scholar, Africa journals online, MIDIRS, was performed using the following key terms: ‘COVID-19’, ‘Africa’, ‘maternal health’, ‘pandemic’, ‘COVID-19 coronavirus’ OR ‘SARS-Cov-V-2’ AND ‘maternal health’ OR *pregnancy OR ‘perinatal’. All the studies went through the PRISMA stages, that is, identification, screening, eligibility, and inclusion[19].
**Inclusion Criteria**

Our search was limited to peer-reviewed research studies or grey literature which used systematic approaches to surveys or data conducted in Africa and published in English between March 2020 and May 2022. Reference lists of selected full texts were screened for additional relevant papers.

**Exclusion Criteria**

Conferences/updates, commentaries, or personal interviews without a clear methodology for reported data and research studies not conducted in Africa, not published in English language and not within the time frame were excluded.

**Data extraction**

The first two authors independently reviewed all studies after duplicates were removed for inclusion and exclusion criteria. Any disagreements in assessment were resolved by discussion and mutual agreement. For each study included, we recorded the last name of author(s), year of publication, country, title, focus/aim, design/methodology, data collection method, sample size and key findings.

**Data synthesis**

Thematic analysis according to the methods of Braun and Clark[20] were used to synthesize the data. The two authors independently read all included papers and coded key elements. Together they identified patterns from the codes from which key themes emerged. Literal interpretation of the data yielded the themes.

**Results**

Among the 179 full text papers screened for eligibility, 36 papers met inclusion criteria (see Fig. 1). Of the studies, 6 were qualitative, 25 quantitative studies, and 5 mixed methods. (See Table 1). The studies were retrieved from 4 African regions with the greatest number from East Africa and four from several sub-Saharan African countries (see Table 2). Synthesis from the relevant studies revealed four relevant themes: effects of lockdown measures, COVID concerns and psychological stress, reduced attendance at antenatal care and childhood vaccination, reduced facility-based births and increase maternal mortality. (Table 3)
<table>
<thead>
<tr>
<th>Author, year, country</th>
<th>Focus/Aim</th>
<th>Design/Methodology</th>
<th>Period of data collection</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akaba G., Dirisu O., Okunade K., et al. 2022 Nigeria</td>
<td>Explore the barriers and facilitators of access to MNCH services during the first wave of covid-19 pandemic in Nigeria</td>
<td>Qualitative</td>
<td>May-July 2020</td>
<td>54 study participants (service users, service providers and policymakers,)</td>
</tr>
<tr>
<td>Asuming P.O., Gaisie D.A., Agula C., et al., 2022 Ghana</td>
<td>Estimate the impact of Covid-19 on delivery of maternal health services using ANC attendance and delivery at health facilities as outcomes</td>
<td>Survey</td>
<td>September-November 2020</td>
<td>288 women (15–49 years)</td>
</tr>
<tr>
<td>Authors</td>
<td>Title</td>
<td>Methodology</td>
<td>Quantitative Data</td>
<td>Qualitative Data</td>
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<tr>
<td></td>
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<td></td>
<td>Timeline data of COVID-19 epidemiology, national and hospital-level events</td>
</tr>
<tr>
<td>Bekele C., Bekele D.,</td>
<td>Assess MNCH utilization during the first six months of the COVID-19 pandemic, as well as potential barriers and enablers of service utilization from health care providers and clients.</td>
<td>Mixed study design</td>
<td>Compared 1st 6 months pandemic to same period in prior year.</td>
<td>8 health facilities (three hospitals and five health centres and interviews with 103 healthcare providers working in the MNCH units of the facilities. In addition to these, ten facility or MNCH department heads and nine women (pregnant and delivered in the time of COVID-19)</td>
</tr>
<tr>
<td>Hunegnaw B.M., et al.,</td>
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<tr>
<td>2022. Ethiopia</td>
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<tr>
<td>Bikwa Y., Murewanhema G.,</td>
<td>1. Determine the impact of the lockdown on MCH outcomes at 2 tertiary hospitals in Harare, Zimbabwe. 2. Estimate changes in MCH interventions due to COVID on maternal, and neonatal mortality in Zimbabwe using the Lives Saved Tool (LiST)</td>
<td>Cross-sectional study Retrospective study of secondary data</td>
<td>March-August 2020</td>
<td>19,835 hospital deliveries</td>
</tr>
<tr>
<td>Kanyangarara M., et al.,</td>
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<tr>
<td>2021. Zimbabwe</td>
<td></td>
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<tr>
<td>Carter ED,</td>
<td>To assess changes in panel survey data</td>
<td></td>
<td>October and</td>
<td>Performance</td>
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<td></td>
<td></td>
<td></td>
<td>Performance</td>
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<tr>
<td>Authors</td>
<td>Title</td>
<td>Methods</td>
<td>Period</td>
<td>Location</td>
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<tr>
<td>Enbiale W., Abdela S.G., Seyum M., et al., 2021 Ethiopia</td>
<td>Assess effect of preventive COVID-19 measures on essential healthcare services in selected health facilities of Ethiopia</td>
<td>July 7, 2019, to July 6, 2020</td>
<td>Medical records of the visitors of health facilities. Data were retrieved from Health Management Information Systems</td>
<td></td>
</tr>
<tr>
<td>Galle A., Kavira G., Semaan A., et al., 2022. DR. Congo.</td>
<td>MHC utilisation along the continuum during the COVID-19 pandemic in the Democratic Republic of the Congo, and factors associated with use of the full continuum</td>
<td>March 2020-May 2021</td>
<td>604 women (15-49 years) who were pregnant</td>
<td></td>
</tr>
<tr>
<td>Author(s)</td>
<td>Title</td>
<td>Research Focus</td>
<td>Study Type</td>
<td>Duration</td>
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<tr>
<td>Laouan F. (2020)</td>
<td>Effect of lockdowns on reduced income and access to basic needs esp. on women, and increased gender-based violence.</td>
<td>Qualitative</td>
<td>April 6 to 23, 2020</td>
<td>226 people across 12 countries</td>
</tr>
<tr>
<td>Mongbo Y., Sombié I., Dao B., et al. (2021)</td>
<td>Analyse the challenges and solutions for maintaining the Continuity of essential health services during the COVID-19 pandemic in Francophone West Africa.</td>
<td>Cross-sectional study</td>
<td>April 2020</td>
<td>18 managers of Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) and vaccination programmes</td>
</tr>
<tr>
<td>Nwafor J.I., Okedo-Alex I.N., Ikeotuonye A.C., 2021</td>
<td>Determine the prevalence and predictors of COVID-19-related depression, anxiety, and stress symptoms among pregnant women</td>
<td>Cross-sectional study</td>
<td>March 1- July 31, 2020</td>
<td>456 pregnant women</td>
</tr>
<tr>
<td>Ombere S.O. (2021) Kenya</td>
<td>How poor expectant mothers with low bargaining power cope during COVID-19 in Kilifi County, Kenya,</td>
<td>Qualitative study</td>
<td>June 13-July 24 2020</td>
<td>12 purposively selected mothers who were either expectant or had new-born babies. 5 matrons-in-charge of maternal health services and 4</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Title</td>
<td>Methods</td>
<td>Study Period</td>
<td>Setting</td>
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<tr>
<td>Semaan A., Banke-Thomas A., Amongin D., et al., 2022. Sub-Saharan Africa (Guinea, Nigeria, Tanzania, and Uganda)</td>
<td>Assesses how maternal healthcare was provided in six referral hospitals in Guinea, Nigeria, Tanzania, and Uganda during the first year of the COVID-19 pandemic.</td>
<td>Mixed-methods design</td>
<td>qualitative data between July 2020 and February 2021</td>
<td>6 referral hospitals, 22 maternity skilled health personnel, WHO COVID-19 timeline cases</td>
</tr>
<tr>
<td>Shakespeare C., Dube H., Moyo S., Eet al., 2021. Zimbabwe</td>
<td>Impact of Covid-19 and lockdown control measures on non-Covid outcomes in tertiary level maternity unit in Zimbabwe</td>
<td>Interrupted time series design</td>
<td>January-March 2020, April-June 2020</td>
<td>All women delivered within the study period</td>
</tr>
<tr>
<td>Shapira G. Ahmed T., Henriette S., et al., 2021. Sub-Saharan Africa (Cameroon, Democratic Republic of Congo, Liberia, Malawi, Mali, Nigeria, Sierra Leone and Somalia)</td>
<td>To predict what service utilization levels would have been in March–July 2020 in the absence of the pandemic</td>
<td>interrupted time series design</td>
<td>January 2018 to February 2020</td>
<td>administrative systems for 63,954 facilities</td>
</tr>
<tr>
<td>Shikuku D.,</td>
<td>Determine the initial</td>
<td>Cross-sectional</td>
<td>March-June</td>
<td>Pregnant women,</td>
</tr>
</tbody>
</table>

traditional birth attendants. |
<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Methodology</th>
<th>Time Period</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tadesse E. 2020</td>
<td>Assess the impact of the COVID-19 on ANC utilization among pregnant women attending public facilities in Northeast Ethiopia</td>
<td>Facility-based cross-sectional study</td>
<td>February 2-August 30 2020</td>
<td>389 pregnant women</td>
</tr>
<tr>
<td>Tefera B., Tariku Z., Kebede M. et al., 2022</td>
<td>Describe MNCH utilization before and during Covid-19 announcement in Ethiopia and forecast 12 months client flow, at Dire Dawa Public Health Facilities</td>
<td>Interrupted time series analysis</td>
<td>Feb 01 to March 13, 2021</td>
<td>Five public health centres and one public referral hospital</td>
</tr>
<tr>
<td>Temesgen K., Wakgari N., Tefera B., et al., 2021a. Ethiopia</td>
<td>Assess maternal health care services utilization amid the COVID-19 pandemic in West Shoa Zone, Central Ethiopia</td>
<td>Community-based cross-sectional study (quantitative)</td>
<td>July 1 – July 30 2020</td>
<td>844 pregnant women or those gave birth in the last 6 months before the study</td>
</tr>
</tbody>
</table>

**Abbreviations:** ANC – Antenatal Care; MH – maternal health care; PNC – postnatal care; (R)MNCH – (reproductive) maternal, newborn child health
<table>
<thead>
<tr>
<th>Themes</th>
<th>Na</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID concerns and Psychological Stress</td>
<td>10</td>
<td>Temesgen et al. 2021a, Ombere 2021, Tadesse 2020, Laouan 2020, Banke-Thomas et al. 2022, Akaba et al. 2022, Abdisa et al 2022, Mongbo et al., 2021, Semaan et al., 2022, Nwafor et al., 2021</td>
</tr>
</tbody>
</table>

Na= Number of Papers
### Table 3
**COUNTRY/REGIONS OF ELIGIBLE STUDIES**

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Region</th>
<th>No. Papers</th>
<th>No. Papers per Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR. Congo</td>
<td>Central Africa</td>
<td>1</td>
<td>Central Africa</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>East Africa</td>
<td>13</td>
<td>East Africa</td>
</tr>
<tr>
<td>Francophone West Africa (Benin, Burkina Faso, Cote d’Ivoire, Guinea, Mali, Mauritania, Niger, Senegal Togo)</td>
<td>West Africa</td>
<td>2</td>
<td>Southern Africa</td>
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<td></td>
<td></td>
<td></td>
<td>West Africa</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Africa</td>
</tr>
<tr>
<td>Ghana</td>
<td>West Africa</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>East Africa</td>
<td>5</td>
<td></td>
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<tr>
<td>Mozambique</td>
<td>East Africa</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>West Africa</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>Central Africa</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>East Africa</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Southern Africa</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Global (with focus on Africa)</td>
<td>Africa</td>
<td>4</td>
<td></td>
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</tbody>
</table>

### Effects of lockdown measures.

A primary strategy used to curtail the spread of the pandemic globally was lockdown. Although pregnant mothers were allowed to access health facilities during emergencies, they had challenges accessing the health facilities during the curfew[21]. The primary source of transportation for women to reach birth centres is either commercial or private transport which was banned in Kenya with few public ambulances operating during curfew hours[16]. Movement restrictions and transport challenges were also identified as barriers to maternal health service uptake in Ethiopia[8,14]. Similarly, the findings of cross-sectional survey of 1,241 Nigerian women by Balogun et al. (2021) and a mixed method study in Ethiopia[8] showed that lockdowns and lack of transportation were barriers to accessing MHC services.
In an effort to get citizens to comply with the lockdown rules, some African countries used the law enforcement agents who often intimidated and harassed citizens so that some were afraid of going out for what is considered essential service. Among a study of four sub-Saharan countries, not only lack of transportation during epidemic peaks but the high cost of transportation limited access to healthcare[22]. According to the report of White Ribbon Alliance (WRA), at least one pregnant woman died in Uganda as a direct result of lack of transportation amid the lockdown[16]. Others observed that pregnant women could not get to the health facility due to lockdown measures and lack of transportation[21, 23, 24, 25, 26, 27].

A survey conducted in Kenya revealed that women and girls reported the curtailment of economic activities affected their ability to pay for services and therefore limited healthcare access[16]. This was similar in Ethiopia where economic suffering prevented women from being able to pay for transportation[8]. A cross-sectional study of 1600 pregnant women Democratic republic of Congo between March 2020-May 2021 identified similar issues[28]. This study showed lack of money along with vaccine hesitancy were some of the reason's women did not access MHC services[28].

The lack of access to health services due to lockdown measures compelled pregnant women to acquire more knowledge of the pandemic and preventive measures. Pregnant women's knowledge and practice of preventive measures against COVID-19 in a low-resource African setting deduced that whilst awareness level of most respondents concerning preventive measures was sufficient, it was observed that the level of practice of these preventive measures was inadequate[53]. On the other hand, a study in Ethiopia found women who practiced infection preventive measures and wore face masks were 2-5 times more likely to access MHC than those who did not[14].

COVID concerns and Psychological Stress

Several studies documented women's concerns to access MCH services for themselves and their children due to concerns of acquiring SARS-CoV-2[14, 30, 31, 32]. A rapid gender analysis in West Africa found a reduction in access to maternal health services due to doubt about health of healthcare workers and the fear of succumbing to COVID-19[32]. Temesgen and colleagues[14] identified fear of exposure to SAR-CoV-2 as a significant barrier in maternal health service uptake in Ethiopia. This was echoed by another four-country study by Banke-Thomas et al.[22]. Several studies specifically cited women's concerns about the lack of PPE for both patients and staff[14, 33]. A Nigerian qualitative study identified barriers to accessing MHC included both women's concerns about lack of PPE and shortage of manpower[34]. Interestingly, a study from Southwest Ethiopia among 402 pregnant women identified important delays in seeking care but fear of contagion or other aspects of the pandemic were not among them[35].

Lack of adequate staffing was due to a combination of lack of personnel out sick due to COVID or concerns about contacting the disease[34, 36] and lockdown effects of limiting transportation and economic activity. This resulted in lack of preparedness by health workers, prioritization of essential services, and long wait times at the hospitals all of which were identified as barriers to accessing maternal, newborn and child health services during the first wave of COVID-19[34]. Similarly mixed method study among skilled healthcare providers in six referral hospitals in Guinea, Nigeria, Tanzania, and Uganda to assesses how maternal healthcare was rendered identified inadequate knowledge about COVID-19, lack of infection prevention and
control training, and difficulties reaching workplace as barriers in providing MHC services[37]. However, shortage of PPE and lack rapid testing for women suspected with COVID-19 were challenges that continued past the first wave[37].

Effects of the pandemic on psychological health have been well documented worldwide. Nwafor and colleagues[29] measured depression and anxiety in 456 pregnant women attending antenatal care in Nigeria during the ongoing pandemic. The rate of moderate or more severe depression was 27% and 22% rated as having moderate to severe stress.

**Reduced attendance at antenatal care and childhood vaccination**

Access to high quality ANC potentially jeopardized the safety of parturient women during pregnancy during episodes of high prevalence of COVID 19 cases. COVID-19 caused distortion in health care services leading to non-regular attendance during ANC in rural and urban areas[22]. Pires et al.[38] investigated whether increased community awareness of the prepared state of a general hospital and health centre for COVID-19 in Mozambique would have a differential effect on use of maternal and child health services compared to 2019 and a comparable hospital and health centre outside the intervention campaign area. There was no effect from the community awareness program and both intervention and control settings experienced as decrease in first antenatal visits in the first trimester of 26% and 12%, respectively. There was also a decline on the percentage of children completing their vaccinations of 16-18%[38]. Similarly, there was sharp 16% decrease in total newborn vaccinations in an interrupted time series study in Ethiopia comparing pre-pandemic and pandemic time periods (739.5 compared to 528.5)[11,13]. Notably, the utilization of MHC services and uptake of vaccinations declined during COVID-19 outbreak in Rwanda[15] and Uganda[24]. A similar interrupted time series study in eight sub-Saharan countries found child vaccinations were the most affected health service[12]. An estimated cumulative deficit of 328 961 third-dose pentavalent vaccinations during the 5 months in these countries was recorded[12]. Similarly, there was increase significant declined in Bacillus Calmette-Guerin (BCG) and pentavalent-3 vaccinations during the early period of the pandemic in Ethiopia[9,10]. A mixed method study in eight health facilities in Ethiopia comparing the service utilisation trends in the first 6 months of COVID-19 with the corresponding time and data points of the preceding year showed reduced ANC visits (208.9 to 181.7/month, p=0.433) and under 5 visits (225.0 to 139.8/month, p=0.007)[8]. An assessment of effect of the pandemic on the uptake of MHC in Somali region of Ethiopia, through a retrospective chart review revealed that the mean number of ANC pre-pandemic was 4088 and intra-pandemic was 3498, a 14% decline in ANC attendance[39]. This decline in ANC visits was corroborated by a national study using reproductive, maternal, and newborn health services data from governmental health facilities in Ethiopia during a similar time period[11]. Similarly, there was sharp decreased in antenatal clinic attendance in Uganda which was already low pre-covid with an increase in pregnancy related problems such haemorrhage, and caesarean section[40]. This was particularly true during the first phase between March and June not only in Uganda but also Nigeria[22]. Similar sharp decreases in ANC visits were observed in eight sub-Saharan countries[12].

Reasons for the low ANC attendance recorded during the COVID-19 period included inappropriate service delivery, pandemic preventive measures, shortage of medical supplies, and staff workload[33,41]. As documented by previous themes, pregnant mothers feared attending ANC would increase their probability of
contracting COVID-19[30]. Similarly, a facility-based cross-sectional study conducted between February and August 2020, among 389 pregnant women found that diversion of maternity health-care service to COVID-19 related services, fear of COVID-19 infection, and transport inaccessibility were notable factors which contributed to the low antenatal care service use by pregnant women in Ethiopia[31].

An interrupted-times series analysis compared 1189 women who delivering in healthcare facilities before the COVID-19 pandemic (September 2019–January 2020) and 540 women who delivered during the pandemic (July through November 2020)[42]. The analysis found that women who delivered during COVID-19 had a 72% higher odds of delayed ANC commencement compared to pre-pandemic data (aOR 1.72, 95% CI 1.24 to 2.37). Moreover, 47% of women who delivered during COVID-19 stated that the pandemic affected their capability to access ANC[42]. A study using a similar design in Ghana, documented a 25% reduction in women attending at least 4 ANC visits during the pandemic compared to pre-pandemic[23]. A similar pattern was identified by Banke-Thomas and colleagues[22] among four sub-Saharan countries but mostly during the first wave (March to June 2020) and the second wave (from last quarter of 2020 through Feb 2021). Conversely, in a comparative study in Ethiopia to compare effect of the COVID-19 pandemic preparation and response on essential health services in primary and tertiary healthcare facilities found no significant variation in ANC visits. The study reported mean ANC visits of 910 pre-COVID and 941 during the pandemic period. However, there was approximately 38% decline of the annual mean visits in April (572) with an increase in visits between May and June by 128% (114)[43] indicating delayed care.

Reduced facility-based births and increase maternal mortality.

The easiest metrics to assess the COVID pandemic’s effect on access to MCH services is the number of births in facilities with skilled birth attendants. Most practically, the government issued curfews may have limited pregnant women’s power to travel and access health services during labour. Similarly, fear of being harassed by security agents reduced health facility births [16]. A WHO survey of 11 African countries showed facility-based births were reduced in 45% of the countries between November to December 2021 compared to a comparable time period pre-pandemic[44]. Additionally, two interrupted time series studies in Ethiopia and among eight other sub-Saharan Africa countries found significant decline in facility delivery births[12,13]. However, facility birth decline was not universal. Bekele and colleagues reported reduced facility delivery rates in Ethiopia which was not statistically significant (90.7 to 84.2/month, p=0.776)[8] and Enbiale and colleagues[43] also in Ethiopia did not find a significant decline. A cross-sectional study at Mpiilo - Zimbabwe Central Hospital compared routine monthly maternal and perinatal statistics three months before and after COVID-19 emergency measures were implemented. The study did not find a significant decrease in births but there was a statistically significant decline in the proportion of births among women booked to deliver at the hospital from a mean of 41.6% (SD ± 1.1) to 35.8% (SD ± 4.3) (p = 0.03) [25].The magnitude of decline in facility births ranged from a low of 3% in Uganda,[24] to 15%-point decrease in 5 regions of Ghana[23]. Studies in both Somalia and Ethiopia recorded over a 20% decrease in skilled birth attendant births [11,39]. A study in six regions of Ethiopia covering 91% of the population, found that a 77% reduced risk of facility-based births during the pandemic compared to pre-pandemic compared to pre-COVID among urban women but no difference in facility-based births among rural women[26]. This resulted in high rise in facility stillbirth (14% vs 21.8%) and neonatal death (33.1% vs 46.2%)[11].
There is some evidence that delays in care due to numerous issues related from COVID-19 increased maternal mortality. A WHO survey among 11 African countries identified an average 16% increase in health facility maternal deaths February to May 2020 which decreased to an 11% increase in 2021[44]. Correspondingly, secondary data analysis from government portals in Uganda found maternal mortality increased by 7.6% during COVID-19 period[24]. On the other hand, a study using the Kenyan Health Information System comparing 2019 data to March to June 2020 data did not show any differences in the maternal mortality ratio except for noting a trend in an increase of adolescent maternal deaths from 6.2% to 10.9%[45].

There is some evidence of increased maternal morbidity during COVID restrictions. Bikwa et al.[46] carried out a retrospective review of maternal audit to determine the impact of COVID-19 on maternal and perinatal outcomes in Harare, Zimbabwe. They compared data from March-August 2020 with data from March-August 2019 which showed a decreased uptake of maternal health services in 2020 and increased maternal morbidities of uterine rupture possibly due to 30% decreased odds of caesareans.

Perinatal and neonatal outcomes also may have worsened. Bikwa et al.’s[46] study in Harrare also found increased odds of both stillbirths and neonatal deaths. Kassie and colleagues[11] identified a sharp rise in facility stillbirth (14% vs 21.8%) and neonatal deaths (33.1% vs 46.2%) in their study in Ethiopia. The study done in Mpilo-Zimbabwe Central Hospital did not find an increase in early neonatal deaths[25].

Discussion

Our integrative review identified significant effects of the pandemic on access to and the quality of care available to pregnant women in all major regions of Africa as well as delayed vaccinations among children. Pregnant women not only had trouble accessing services because of transportation restriction and high cost of transport but also because maternal health services were curtailed due to lack of healthcare workers, either due to illness, lack of PPE, or shifting personnel to care for COVID-infected patients[47]. There is evidence that delayed or curtailed care resulted in increased maternal morbidity and mortality as well as increased neonatal morbidity. The full effect of maternal lives lost from the shift from facility to home births may not yet be appreciated due to the slow reporting for maternal deaths at home[44].

Our results on the effects of COVID on worsening maternal health echo the findings of a larger global systematic review of both low- and high-income countries with the exception of preterm births which only increased for high income countries[48]. However, unlike that review of mixed income countries which did not find significant differences in maternal morbidities or stillbirths, our review found evidence that weakened health facilities and changes to usual care from lockdown measures had an adverse effect on maternal and neonatal outcomes among some African countries. This current review did not examine the literature related to the differential effect COVID infection had on pregnant women resulting in those who were pregnant having sicker presentation and higher mortality rates[49].

Both high- and low-income countries have identified worsening of people's mental health during the pandemic[50]. Several studies have documented the pandemic may have had a differential impact on women due to not only loss of employment but the burden of other responsibilities, such as running the
household, general caring for children with the added role of taking on educational tasks[50]. A systematic review related to mental health effects of COVID on pregnant and lactating women found from studies in middle- and high-income countries, high rates of anxiety, depression, and social dysfunction[49,51]. This echoes the findings in the single study in our integrative review that addressed the mental health effects among pregnant and postpartum women in Nigeria which documented a rate of severe depression of 22% and moderate to severe anxiety of 27%[29]. Although these authors did not report a comparable baseline rate of depression among Nigerian pregnant women, a global systematic review reported a baseline rate of 15% indicating a potentially significant effect of the COVID-19 epidemic on pregnant women's mental health[52].

An important finding from Almeida et al.[50] on the differential effect of COVID on women was the importance of social support as a mediator in dampening the effects of the pandemic on women's mental health. Some governments in African countries failed to put in place adequate measures to bolster social support to mitigate the negative fallout of the lockdown measures, such as loss of daily income by low-income families in the informal sector, psychological and social effects on women and children, security threats to lives and properties, and other criminal activities[16,21,53]. An important lesson for the future is that governments need to better analyse the costs and benefits of different actions in preparing for the next epidemic. Also, better methods of clear and transparent messaging are essential so that people do not lose trust in what they are hearing from government messaging.

The COVID-19 lockdown showed that the measures put in place was not fool proof as other ingredients should have been integrated into the arrangements. Most of the studies reported that measures to prevent and/or decrease the spread of SARS-CoV-2 infection such as curfews and inflexible law enforcement agents, limited access to needed medical care, transport curtailment, total closure of government offices and private businesses, closure of airports were not welfare considered and people centred in implementation[14,16,21]. Additionally, the pandemic revealed already known weaknesses in the health systems in Africa, such as workforce shortages, lack of equipment and resources – particularly PPE, and lack of suitable training of personnel. The needed shift of resources to caring for very ill COVID patients meant fewer resources for pregnant and labouring women[34,47]. Recommendations to deal with epidemic related issues in the future include a need to develop plans ahead of time, methods to limit exposure of health personnel through adequate training in the use of PPE and adequate availability of PPE but also conserving PPE to be used only when needed[47]. Additionally, there needs to be a focus on maintaining health personnel's well-being through the provision of resources, such as childcare and meal preparation, as well as psychological support to manage the stress of working during such as crisis[47]. Also, governments should create a buffer fund with legislative support to enable adequate and timely provision of financial and social and health support services to vulnerable groups and low-income families that depend on daily income[54,55]. Governments need to improve funding of primary health care and introduce robust mechanisms to respond to health emergencies and crises[56,57].

One of the most difficult issues is how to recruit and train needed personnel during an epidemic since unlike high resourced countries with many more health providers per population, in general African countries are already understaffed. A fuller examination of the efficiency and cost of the approach adopted by some
countries of recruiting and training unemployed health workers and incentivizing public health workers is needed[58].

Several studies confirmed a decrease in ANC and skilled birth attendants leading to an increase in pregnancy-related problems and decrease in immunizations[21,22,23,31,40,42]. Reduced attendance at ANC was a reality due to the public health concerns of the disease being spread among groups of people. However, ANC plays a crucial role in maintaining the health of pregnant women and their foetuses. One option might be establishing "mid-point clinics" to ensure proximity to health facilities but overcomes the challenges of inadequate space at health facilities, and reduces the burden of transportation and other lockdown measures that served as hindrances to accessing health facilities during an emergency.

**Limitations**

This focussed mainly on papers published in the English language. Some papers from Francophone and Lusophone African not publish in English countries with no available English translation were automatically excluded. As already noted, the review included papers published between March 2020 and May 2022 because the first recorded COVID case in Africa was on the 14th of February 2020.

**Conclusion**

The already existing limited access to quality maternal healthcare was exacerbated by the pandemic. While it is important to understand the extent to which women and their infants are susceptible to COVID-19, it is also crucial to comprehensively understand how the pandemic influenced other factors which affected access to quality and safe care, either directly or indirectly. Efforts need to be made to ensure that basic maternal health needs of women such as access to up-to-date information, quality care, and availability of transportation among others are not ignored any at time. Healthcare systems need to be strengthened to prioritize maternal health services during and after the COVID-19 pandemic. This could be achieved by soliciting investments from various sectors to provide high-quality care that ensures sustainability to all layers of the population.

**List Of Abbreviations**

WHO- World Health Organisation

AIDS-Acquired Immunodeficiency Syndromes

ANC-Ante-Natal Care

BCG- Bacillus Calmette-Guerin

COVID-19- Corona Virus Diseases-2019

HIV- Human Immunodeficiency Virus

MHC- Maternal Health Care
OECD-Organisation for Economic Co-operation Development

PNC- Post-Natal Care

PPE- Personal Protective Equipment

WHO- World Health Organisation

WRA- White Ribbon Alliance

Declarations

Ethics approval and consent to participate

No approval sought for the study from Ethics Committee or an Institutional Review Board. Hence consent to participate is not applicable to this study.

Consent for publication

No consent needed as the study is a review

Availability of data and materials statement

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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Competing interest

The authors declare no competing interest.

Author's contribution

Conception and design were done by E.K.S., M.O.

E.K.S, M.O., M.B. D.A., O.E. wrote the main manuscript text

Analysis and interpretation by E.K.S., M.B. M.O.

Critical revision by D.A., O.E., M.D., R.W., E.A. M.B.

E.K.S. M.O. M.B. prepared figure 1, table 1-3.

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Figures
Figure 1

PRISMA Flow Chart

Records identified through database searching (n = 175)

Additional records identified through reference list of articles (n = 25)

Records after duplicates removed (n = 179)

Duplicate removed (n = 21)

Full-text articles assessed for eligibility (n = 179)

Full-text articles excluded (n = 143)
  - No systematic data collection
  - Not on maternal health
  - Article not published in English & Africa
  - Not within the time frame

Included Studies (n = 36)

Qualitative Studies n = 6
Quantitative studies n = 25
Mixed Method n = 5