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Effects of COVID-19 on Maternity Services in Selected Public Health Facilities from the Priority MNCH Counties in Kenya (http://edelweisspublications.com/edelweiss/article/effects-covid-19-maternity-services-selected-public-health.pdf)

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Abstract

Background: Covid-19 is a rapidly evolving pandemic, affecting both developed and developing countries. Maternity services in low resource countries are adapting to provide antenatal and postnatal care midst a rapidly shifting health system environment due to the pandemic. Objectives: The objective of the study was to determine the effect of COVID-19 on maternity services in selected levels III and IV public health facilities within five MNCH priority counties in Kenya. Method: A two-stage sampling approach was used to select health facilities. The study employed cross-sectional and observational retrospective approaches. Data was collected from Maternity facilities managers and registers in a total of 28 levels III and IV facilities. Open Data Kit (ODK) formatted tools were used to collect data. Data was analysed using STATA Version 15. Descriptive statistics, Chi-square and fishers exact tests were used to analyse data. For all tests, a p-value <0.05 was taken as statistically significant. Results: A total of 31 midwifery managers were interviewed and a total of 801 maternity records (400 before COVID and 401 during COVID-19 pandemic) were reviewed from levels III (66%) and IV (34%) facilities. The managers indicated that Antenatal Care (ANC) visits had reduced (67.9%), referrals of mothers with complications got delayed (29%), mothers feared delivering in hospitals (64.5%). The managers reported that New-born care services were most affected by the pandemic (54.8%) followed by ANC services (45.2%). Facility records revealed a 19% higher ANC attendance before COVID than during the pandemic. Neonatal deaths increased significantly during Covid-19 period ((P=0.010) by 38%. Live births significantly increased during the pandemic (p <0.0001). Significant increases also observed in mothers who developed labour complications (p=0.0003) and number of mothers that underwent caesarean sections (p <0.001) during the pandemic period. Conclusion: The fear of the Covid-19 pandemic had a cross-cutting effect on utilisation of maternity services.

Full-Text

Introduction

COVID-19 pandemic appeared for the first time in Wuhan City of China in 2019; and spread nearly to include all other countries all over the world. Since this time, it continues to present a great life challenge affecting all aspects of humans including health and economic matters [1]. According to WHO, globally adverse maternal and new-born care outcomes have been on a downward trend [2]. Midwives are currently among the frontline health workers who are suffering the impact of the Covid-19 pandemic [3]. Midwives are the pillar of Maternity and Reproductive health programmes and the face of health services delivery among frontline health workers. Midwives help with most of the 130 million deliveries that occur every year in the world [4].

In Kenya, there have been reports of decreased antenatal attendance, immunisations, and hospital deliveries, along with an increase in stillbirths during COVID-19. The decline may be as a result of restricted access to health facilities arising from city lockdowns and curfews imposed by the government, where pregnant women and their companions feared harassment and arrest by the police. Additionally, fear of contracting COVID-19 may keep many women from attending reproductive health services. Similar issues were raised during the recent Ebola pandemic [5]. According to the Kenya Ministry of Health (MOH), level III facilities provide primary care services but with additional support. They include health centres, maternity and nursing homes. Many are currently able to offer in-patient services, mostly maternity. These facilities usually receive referrals from level I and II facilities. On the other hand, level IV facilities are the first-level hospitals whose services complement the primary care level. Together with level V facilities, these form the county referral hospitals. Majority of the referrals to this level are from levels II & III. Facilities at this level offer in- and out-patient services and have large laboratories that offer diagnostic services that otherwise would not be available at the primary care facilities. In emergency cases, referrals to this level may also come from Level I [6].

A review of the existing literature demonstrates there is information gap on the effect of coronavirus disease (COVID-19) to midwifery services in five Counties in Kenya. Therefore, the current study aimed to assess the effect of COVID-19 on maternity services in selected levels III and IV public health facilities within 5 MNCH priority counties in Kenya.

Methods

Study setting: The study was conducted in selected levels III and IV facilities located within the UNFPA and MOH, MNCH priority counties. Kilifi County is found on the coastal part of the country, Migori on the Western, Garissa on the Northern part, Isiolo on the Eastern while Nairobi is the capital city of Kenya. A total of 28 health facilities in 17 sub-Counties were reached across the five counties.

Study design and Procedure: The study employed both cross-sectional and observational retrospective study design. Data was collected from maternity units managers and previous registers. Data collection focused on how Covid-19 had affected access to and utilization of maternity services by pregnant women four months before covid-19 and four months during the covid-19 period. Before extracting the information or talking to the midwifery managers, investigators explained the objectives of the research and assured the participants of their confidentiality. A total of 31 managers were interviewed and 801 maternity records were reviewed from all the selected level III and IV facilities. The facilities were randomly chosen from MoH master health facility list at the county level.

Study variables: The questionnaire included information on the County, level of facility, duration of service and education level of the health workers. It also included the potentially affected health services and source of information on COVID-19. It also included ANC visits, access to skilled birth attendance information and services, post-natal care attendance and follow-up.

Data collection: A two-days training programme comprising of introduction to study objectives and instruments as well as review of the instruments, practice interviews and data collection was conducted. To improve on data accuracy and reduce data entry errors, the selected enumerators were trained on data collection using mobile phones (ODK). Research Assistants (RAs), were recruited and trained from each of the 5 counties based on a set criterion; included ability to use computers and mobile phone applications, training in health or social sciences, and familiarity with the respective region or county. The tools were piloted in a facility external to the counties of interest and feedback shared for any corrections before actual data collection commenced. Quantitative data checklist with variables of interest, were used in interviewing respondents. The quantitative instruments were piloted during the training of research assistants. Due to COVID-19, all the enumerators were given masks and sanitizers for the entire period that they were in the field.

Statistical analysis: The quantitative data was analysed using STATA Version 15. Descriptive statistics, such as frequency counts, percentages, mean, and standard deviation were used to analyse the demographic details of the respondents and health related variables of interests. Cross tabulation, chi-square test and fishers exact test were used to find association between selected maternity care indicators and selected time intervals of the pandemic. For all tests, a p-value <0.05 was taken as statistically significant. Incidence Rate Ratio (IRR) was also calculated to establish mothers' comparative risk exposure before and during the pandemic.

Results

Social-Demographic results: A total of 31 midwifery managers were interviewed and a total of 801 maternity records reviewed from the selected public health facilities in 5 MNCH priority counties in Kenya. Level III facilities accounted for slightly over half (51.6%) of the facility manager respondents. The records reviewed were proportionate to the number of levels III and IV facilities in each of the selected five counties (Figure 1). It emerged that 71.7% of the files reviewed belonged to unemployed (housewife) mothers of whom 92.1% were married. For the interviewed facility maternity managers, 48.4% of them had worked for 1-3 years in their current station and the highest level of professional education for most of them (67.7%) was a diploma in either nursing or midwifery (Table 1).

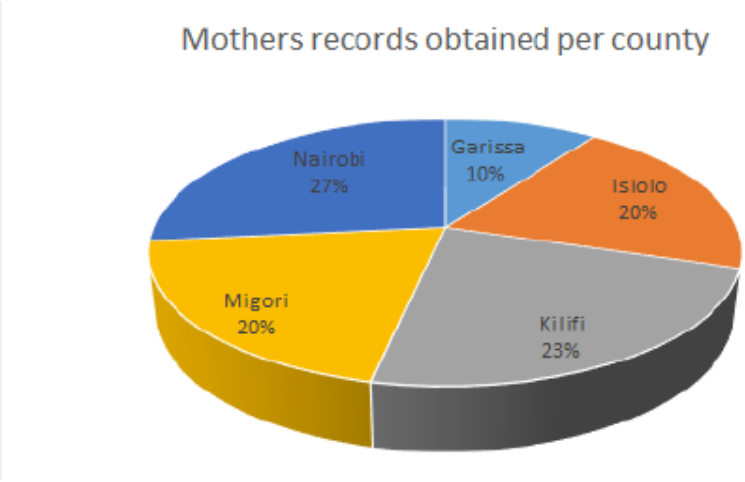

Figure 1: Mothers records obtained per county. (http://edelweisspublications.com/edelweiss/figures/nhc-21-104_figure_1.png)

Variable	Frequency	Percentage
County		
Garissa	4	12.9
Isiolo	2	6.4
Kilifi	11	35.5
Migori	10	32.3
Nairobi	4	12.9
Level of facility		
Three	16	51.6
Four	15	48.4
Duration of service		
Less than a year	15	48.4
1-3 years	7	22.6
4-5 years	3	9.7
>5 years	6	19.3
Education level		
Certificate	1	3.2
Degree	9	29
Diploma	21	67.7

Table 1: Demographic Characteristics of the Midwifery Managers (N= 31).
(http://edelweisspublications.com/edelweiss/figures/nhc-21-104_table_1.png)

Managers perceptions on the effect of Covid-19 on maternity services and facilities preparedness: According to the managers, COVID 19 affected women's utilization of ANC services given that ANC visits reduced (67.9%), with the 1st ANC visits reducing by (50%). Only 3.6% of the managers responded that 1st ANC visits increased majority being from facilities that acted as referral centres. Provision of midwifery services was similarly affected; 58.1% of the managers reported that emergency services were available, 51.6% of the managers indicated that the services were not affected while 41.9% of them were of the opinion that midwives had limited opportunities to carry out routine ANC visitations in the community (Figure 2). On Skilled Birth Attendance, the mangers responded that mothers feared delivering in hospitals (64.5%), some mothers were delivering with the assistance from TBAs (45.2%) and referrals of mothers with complications was getting delayed (29%) as a result of the government instituted movement restrictions that affected the whole country. The managers also observed that during COVID-19 there was an increase in cases of Gender Based Violence (71%), unplanned pregnancies (90.4%) and still births (48.3%). They also indicated that uptake of FP commodities had reduced (64.5%), uptake of immunization services was low (80.6%) and opportunities for educating antenatal mothers were quite limited by the pandemic (83.9%).

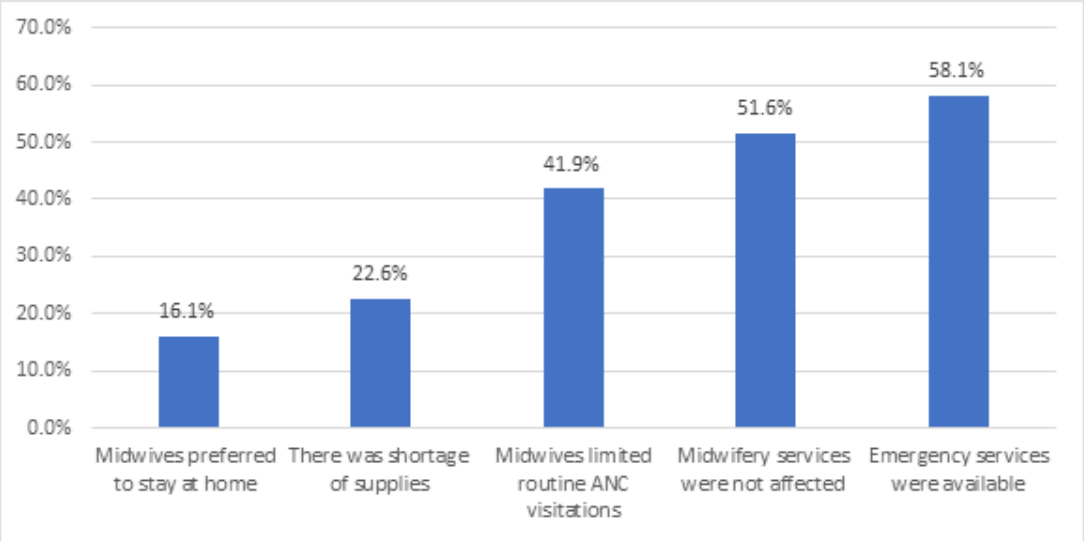

Figure 2: How Covid-19 affected the provision of Midwifery services.
(http://edelweisspublications.com/edelweiss/figures/nhc-21-104_figure_2.png)

A total of 25(80.7%) facility managers confirmed that midwives received training on how to handle reproductive health clients during the covid-19 pandemic. More than a third (35.5%) of the facilities according to the managers were operating below the capacity, 9(29%) were running at a normal capacity, 6(19.3%) on average while 5(16.1%) were above their capacity especially those that were serving as referral centres. The most affected perinatal services according to the managers were ANC services (74.2%), EPI services (71%), family planning services (61.3%) and post-natal services (54.8%). The least services affected were new-born care services (16.1%) and emergency services (29%) as depicted in Figures 3 and 4.

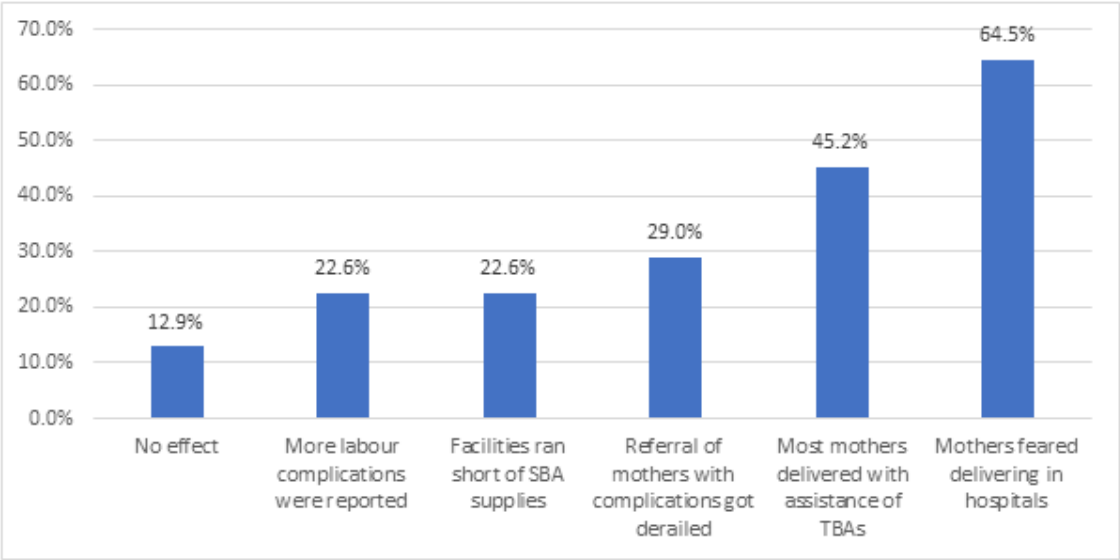

Figure 3: How COVID-19 affected Skilled Birth Attendance (SBA) services.
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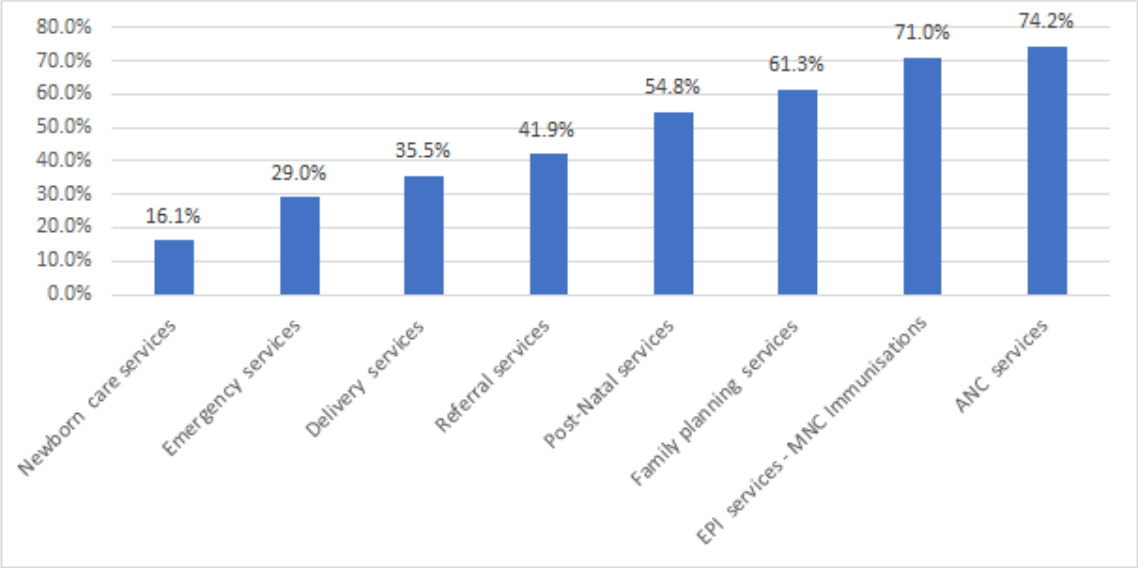

Figure 4: Managers perceptions on how Covid-19 affected perinatal services.
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The major source of information on Covid-19 for the health workers was national guidelines (74.2%), trainings by the hospital (64.5%) and MOH/County website (51.6%). Social media ranked fourth (41%) while WHO website was (25.8%). No association was found between the facilities that had diagnosed COVID-19 cases with their socio demographic characteristics and other health related variables. However, more cases were reported in Nairobi City County and level IV hospitals. In addition, out of the 11 facilities that were operating below the normal capacity, 72.7% had a COVID-19 case diagnosed in them. As far as ANC visits were concerned, more than two thirds (63.2%) of the reduced ANC visits were among the facilities that diagnosed COVID-19. More than three quarters (77.8%) of referrals of mothers that were delayed and 64.3% of reported cases of mothers who delivered with assistance from TBAs occurred in facilities that diagnosed COVID-19 cases as depicted in Table 2.

Facility had diagnosed COVID-19 cases			Statistics
Variable	**Yes n (%)**	**No n (%)**	
County			
Garissa	1(25)	3(75)	P= 0.21
Isiolo	1(50)	1(50)	
Kilifi	7(63.6)	4(36.4)	
Migori	4(40)	6(60)	
Nairobi	4(100)	0	
Facility level			
Level IV	10(66.7)	5(33.3)	$\chi2 = 1.64$, P=0.2
Level III	7(43.7)	9(56.3)	
Operational capacity			
Above normal	1(20)	4(80)	
At normal	5(55.6)	4(44.4)	
Below	8(72.7)	3(27.3)	
On average	3(50)	3(50)	
All ANC Visits Reduced			
Yes	12(63.2)	7(36.8)	$\chi2 = 1.37$, P=0.24
No	5(41.7)	7(58.3)	
Effect on Skilled birth attendance			
More labour complications reported			
Yes	4(57.1)	3(42.9)	No statistic
No	13(57.2)	11(45.8)	
Mothers feared delivering in hospitals			
Yes	11(55)	9(45)	No statistic
No	6(54.5)	5(45.5)	
Referrals of mothers with complications got derailed			
Yes	7(77.8)	2(22.2)	P= 0.13
No	10(45.4)	12(54.5)	
Mothers delivered with assistance from TBAs			
Yes	9(64.3)	5(35.7)	P= 0.47
No	8(47.1)	9(52.9)	

Table 2: Cross-tabulation between facilities who had diagnosed COVID-19 cases with other variables.
(http://edelweisspublications.com/edelweiss/figures/nhc-21-104_table_2.png)

Effect of Covid-19 on pregnancy outcomes

ANC services: Data extracted from the facilities supported the maternity facility manager's opinions; 1st, 2nd, 3rd and 4 Plus ANC visits revealed 5 a mean reduction during Covid-19 as shown in Figure 5. The results indicate a difference in the proportion of mothers attending ANC clinics with lower proportion observed during COVID as compared to Pre-Covid-19. This was true across the 1st, 2nd, 3rd and 4th ANC visits before COVID. Figure 6 highlights the high decline in mothers attending ANC clinics in later visits as compared to earlier visits. Further analysis indicated that cumulatively, ANC attendance was 19% higher before Covid-19 than during the pandemic. Facility data indicated a decline in the proportion of ANC visits for all the four visit in the early months after COVID-19 cases were reported in the country (between March to May 2020) and thereafter an increase in the number of visits was observed between months of May and June 2020 when movement restrictions got lifted as depicted in figure 6.

Maternal deaths: Facility data indicated a sharp increase in the number of maternal deaths in the early months after COVID-19 cases were reported in the country (between month 5 (14.3%; n=3) and 6(28.6%; n=6) compared to the cases before COVID-19 (month 4 (9.5%; n=2). Thereafter a reduction in the number of maternal deaths was observed between months 6 to 8 (4.8%; n=1) when movement restrictions got lifted. Despite the reduction in absolute numbers (Table 3), further analysis found no sufficient evidence that maternal deaths were significantly affected by COVID-19 (p=0.05784).

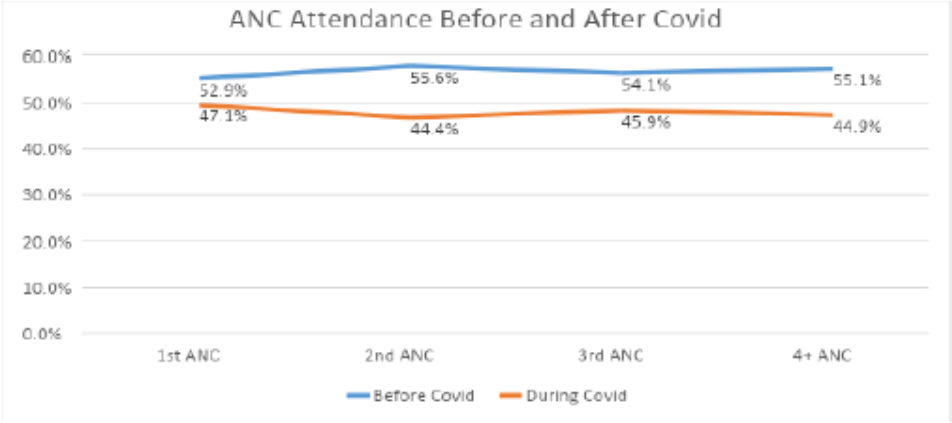

Figure 5: Trends of ANCvisits comparison before and during Covid-19. (http://edelweisspublications.com/edelweiss/figures/nhc-21-104_figure_5.png)

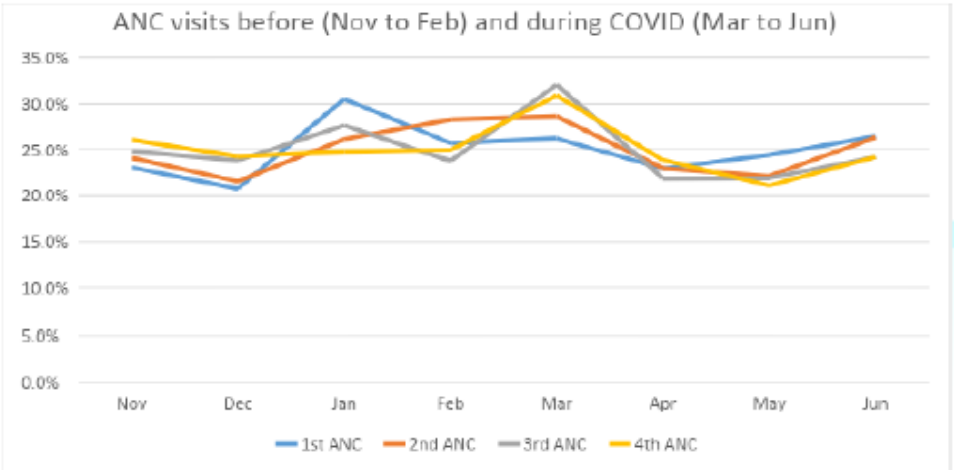

Figure 6: Monthly trends in proportion of mothers attending ANC visits 4 months before and four months during the Covid-19 pandemic. (http://edelweisspublications.com/edelweiss/figures/nhc-21-104_figure_6.png)

	IRR	Std. Err.	z	P>|z|
Maternal death	0.4	0.1932	-1.9	0.0578
Neonatal deaths	0.6234	0.1146	-2.57	0.0101
live births	0.8546	0.0113	-11.9	<0.0001
stillbirths	0.97	0.0906	-0.33	0.7439
labour Complications	0.8303	0.0429	-3.6	0.0003
caesarean section	0.8548	0.0291	-4.61	<0.0001
BCG immunisations	0.882	0.0137	-8.08	<0.0001
FP services uptake	0.9928	0.0115	-0.62	0.5344
returned for follow up	0.9169	0.014	-5.7	<0.0001
postpartum complications	0.8142	0.0898	-1.86	0.0625

Table 3: Effect of Covid-19 on pregnancy outcomes. (http://edelweisspublications.com/edelweiss/figures/nhc-21-104_table_3.png)

NB: IRR of <1 suggest increase risk to the exposed group (during Covid-19) To get the percent chance the (1-IRR) e.g. Maternal death 1-0.4 = 0.6 interpreted as 60% difference of incidence between before and during Covid-19) Since the IRR is <1 it means increased risk to the exposed thus 60% increase in numbers. The P> |z| indicates if the IRR is significant based on the std error and the z values. As is the standard case any value <=0.05 is significant.

Neonatal Deaths: The number of neonatal deaths reported in facilities between month 4(6.4%; n=8) and 5(24.8%; n=31) which were months when the first COVID-19 cases were reported increased. After month 5, the number of neonatal deaths were observed to decrease up to month 6(11.2%; n=14) with minimal changes in numbers between month 6 and 8(12.8%; n=16) this being the period when movement restrictions got lifted. Overall the increase of neonatal mortality increased significantly during covid-19 pandemic at P= 0.010).

Live Births and Still Births: An upward trend was observed in the number of live births during COVID 19 compared to before COVID 19. The highest increase in live births was observed between month 4 (12.1%; n=2797) and 5 (14.8%; n=3418). However, a slight decrease in the number of cases between month 5 and 6 (12.8%; n=2960) as well as 7 (14.1%; n=323) and 8 (12.2%; n=2805). There was no significant evidence that the number of stillbirths changed before and during COVID-19. However, there was an increase in the number of stillbirths in the early period between month 4 (12%; n=55) and 5(15.5%; n=71).

Caesarean sections and Labour complication: An upward trend was observed during COVID-19, although a slight reduction in the number of labour complications was observed in months 5(14.2%; n=215), 6(12.9%; n=195), 7 (14.6%; n=220) and 8 (12.9%; n=195). Further analysis (Table 3) revealed that the number of labour complications significantly increased (p=0.0003) by 17% during the Covid-19 period. Compared to the period before COVID-19, higher cases of caesarean section were reported during COVID 19. There was an increase in the cases between month 4 (10.9%; n=380), 5(13.3%; n=461), 6 (12.8% n=445) and 7(14.9%; n=516). Incidence Rate Ratio (IRR) revealed that there was a significant (p <0.001) increase in the number of caesarean sections by 15% during the Covid-19 period.

Discussion

The COVID-19 pandemic has led to maternity services adjusting how they provide antenatal care to pregnant women due to the government restrictions regarding social distancing, which has impacted on pregnant women's access to routine antenatal care [7]. In this study, both the views of the midwifery managers and findings from the facility records data revealed that COVID-19 has effects on maternity services and associated outcomes. Though rare, obstetric complications and outcomes including maternal death, stillbirth, miscarriage, preeclampsia, foetal growth restriction, coagulopathy, and premature rupture of membranes among others have been reported among pregnant women during the COVID-19 pandemic [8]. Increase in neonatal deaths is alluded to reduced utilization of ANC and Skilled Birth Attendance (SBA) services out of fear of contracting the dreaded infection in health facilities during the pandemic thus some women preferred to seek services of the Traditional Birth Attendants (TBAs).

In addition, a study in London suggests that stillbirths may become more common as a direct or indirect consequence of the pandemic [9]. This view seems to support our findings in which there were increase in neonatal deaths and labour complications during the COVID-19 period. The same is supported by Pallangyo et al., 2020 [10] when they state that lack of antenatal care has reportedly led to poor maternal and neonatal outcomes such as ruptured uterus or stillbirth. In our study, utilization of ANC services was majorly affected during the COVID-19 period, a finding corroborated by observations in a related study on effects of COVID-19 on utilization of Antenatal Care services [11, 12].

The World Health Organization (WHO) appreciates that COVID-19 pandemic may cause disruptions in the provision of routine immunization services and may in addition reduce demand for such services (e.g., due to concern about virus transmission, inconvenience of rescheduled appointments or transportation barriers). According to the world Health Organization, these challenges may result in an accumulation of susceptible individuals and ultimately the resurgence of vaccine-preventable diseases [13]. In our study, the midwifery managers confirmed that there was in deed disruption of uptake of immunization. This is similar to a study by Mansour et al., 2021 [14] and Ali, 2020 [15] in which the same was reported. Evidence show that the deaths prevented by sustaining routine childhood immunisation in Africa far outweigh the excess risk of COVID-19 deaths associated with vaccination clinic visits, especially for the vaccinated children.

Outbreaks of vaccine-preventable disease have been observed during previous interruptions to routine immunisation services, such as during the 2013-16 Ebola outbreak in west Africa, when most health resources were shifted towards the Ebola response and decreased vaccination coverage led to consequent outbreaks of measles and other vaccine-preventable diseases [16].

In another study conducted to assess the performance of routine immunization, thirteen of the 15 countries showed a decline in the monthly average number of vaccine doses provided, with 6 countries having more than 10% decline. Nine countries had a lower monthly mean of recipients of first dose measles vaccination in the second quarter of 2020 as compared to the first quarter [17]. According to our findings more mothers feared delivering to the hospitals leading to almost half being assisted by traditional birth attendants. The findings are similar to numerous reports that have shown decrease in hospital deliveries [5,18]. This could be attributed to restricted access to health facilities as a result of lockdown and curfews that Kenyan government had imposed to reduce infections. The knock-on effects of the lockdown may mean that some pregnant women or new mothers were not able to afford to pay for health care, while others out of fear of either contracting the virus or being mistaken for a patient seeking COVID-19 care [19].

This study reveals that more than a third of delivery services were affected during the pandemic. This could have been necessitated by low activities and inadequate resources including health workers at the lower tiers hence referrals. In some instances, maternal and child health clinics might have been converted into isolation rooms or the facilities suspended altogether. In addition, the health workers in these facilities might have been infected by COVID-19. For instance, a maternity wing in the coastal part of Kenya was converted into an isolation ward and in Mombasa County, maternity and other services were suspended when Tudor Hospital, a referral health facility, converted into an isolation centre. Although some healthcare providers had been trained to offer maternal health services, they lacked Personal Protective Equipment (PPE), putting themselves and pregnant women and mothers at risk for COVID-19. On 14 July 2020, it was reported that at least 41 employees (19 health care workers and 22 support staff) at the country's largest maternity hospital had tested positive for COVID-19 [20]. Our findings also revealed an increase in unplanned/unintended pregnancies with 90.4% of facility managers confirming this. This is similar to findings from a related study [21].

The pandemic has been linked to disrupted uptake of contraceptives which is a component of maternal health services. During the pandemic, as a result of restricted movements, community and health facility linkages got disrupted too. Our findings show that there has been increase in domestic violence during COVID-19 with 71% of the health workers confirming the position. The findings are similar to a review by Mittal et al., 2020 [22] found an alarming rise in the incidents of gender-based violence during the COVID-19 pandemic. A study done in UK and Kenya also found an increase in patients seeking care for intimate partner violence three months into lockdown in Kenya [23]. According to WHO, the high cases of domestic violence could be attributed to stress, loss of income and isolation [24]. In conclusion, Covid-19 pandemic has been found to have a cross-cutting effect on utilization of maternity services due to fear from acquiring infections from hospitals and health care units.

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Keywords

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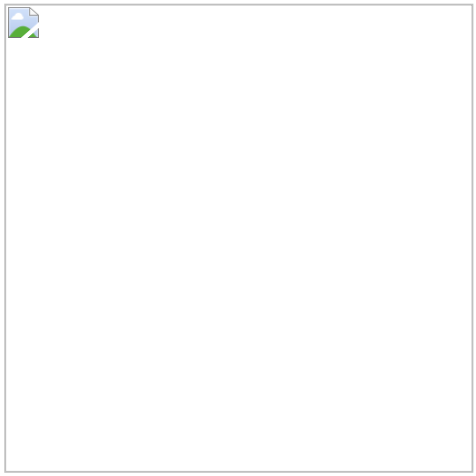

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Keywords