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Impact of corona virus disease 2019 on antenatal care services in rural western Uganda; a retrospective study

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ABSTRACT

Introduction: The Coronavirus 2019 (COVID-19) outbreak poses an important threat to public health but also unique challenges to healthcare workers. The pandemic has resulted into redirection of funds and attention by governments, donors, and stakeholders towards COVID-19 containment efforts, thereby diverting focus from other important issues including sexual and reproductive health. This study aimed to determine the short term impact of COVID-19 on antenatal care services at Kampala International University Teaching Hospital (KIU-TH) between March and May 2020.

Methods: This was a retrospective study in which we reviewed records of mothers who attended antenatal care clinic at KIU-TH for the months of March, April and May in both 2019 and 2020. The health workers attached to the antenatal care clinic during the periods filled a questionnaire to report on challenges faced by the service providers. The data obtained was analyzed using SPSS version 22.

Results: Data for 2,379 clients was analyzed in total. The percentage reduction in antenatal care attendance was 7.1% in the year 2020. The services that were significantly affected were fetal heart listening and administration of intermittent preventive treatment (IPT) for malaria prophylaxis. The main challenges faced by the service providers were: lack of transport means, excessive work, exhaustion and fear of contracting COVID-19 infection.

Conclusion: COVID-19 pandemic significantly reduced antenatal care service provision during the study period. Measures should be put in place to ensure that antenatal services can be offered appropriately and safely without compromising the clients nor the health care workers during outbreaks.

1. Background

Antenatal care (ANC) helps to ensure the well-being of the mother and fetus through early detection of risks in pregnancy, prevention of pregnancy and labor complications and ensures the safe delivery of mother and child (Ahmed & Manzoor, 2019). The global estimates of the indirect impacts of COVID-19 could amount to a 38.6 % increase in maternal mortality, and 44.7 % increase in child mortality per month across 118 low and middle-income countries (Burt et al., 2021). The main factors proposed for these poor clinical outcomes include disruptions to childbirth services and antenatal care (ANC) such as the management of pre-eclampsia and supplementation advice (Burt et al., 2021). Further impacts on maternal and child outcomes may be seen

through issues surrounding the provision of prevention and management of HIV, reduced lactation support and conflicting guidance on whether to avoid breast feeding if infected (Burt et al., 2021). These impacts have been reported in some low-resource settings globally, particularly with reduced antenatal attendances, linked to transportation restrictions, fear of transmission and lack of antenatal education (Burt et al., 2021).

A global report in 2017 showed that out of five women only three attended antenatal care at a minimum of four antenatal visits, with Sub-Saharan African countries having only 52 % of women having at least four ANC visits even in the absence of the pandemic (UNICEF, 2017). The pandemic has also resulted into redirection of funds and attention by governments, donors, and stakeholders towards COVID-19

Abbreviations: ANC, Antenatal Care; Covid-19, Coronavirus disease 2019; KIU-TH, Kampala International University Teaching Hospital.

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containment efforts, thereby diverting focus from other important issues including sexual and reproductive health (Ogunkola et al., 2021).

The first case of COVID-19 in Uganda was reported on 21 March 2020 (Ministry of Health Uganda, 2020). This resulted into border closures, port-of-entry screenings and quarantines for travelers (Umvilighozo and Sonela, 2020). By 25 March 2020, this escalated to a ban on group gatherings and non-essential internal travel, recommendation to work from home and closure of schools (Umvilighozo and Sonela, 2020). The travel restrictions included the cessation of all public transport and a ban on the use of private vehicles without explicit permission to travel (Pallangyo et al., 2020). This study was aimed at determining the short term impact of COVID-19 on antenatal care services at Kampala International University Teaching Hospital (KIU-TH) by comparing the services between 2019 and 2020 in relation to attendance, services offered and challenges faced by ANC service providers.

2. Materials and methods

2.1. Study Design, population and setting

This was a retrospective study in which all records of mothers that attended antenatal care at Kampala International University teaching hospital (KIU-TH) for the months of March to May in 2019 and March to May in 2020 were reviewed. The health workers that were attached to the antenatal care clinic in the same period filled a self-administered questionnaire to identify the challenges faced by the service providers. KIU-TH is a not-for-profit hospital located in western Uganda and has an antenatal care clinic that runs from Monday to Friday. On average 5000 mothers attend the clinic per year (unpublished data). The clinic is run by a team of midwives and a gynecologist or a senior house officer (resident). The antenatal care clinic was functional even during the COVID-19 pandemic lock down period. Every patient that attends the clinic is recorded in a structured book that captures the patient information and the services offered. Since all records of patients that attended ANC at KIU-TH in the study period were reviewed and all health workers that were attached to the clinic were considered for filling the self-administered questionnaire, there was no need to calculate the sample size.

2.2. Eligibility criteria and sampling

All records of mothers that attended ANC at KIU from 1st March 2019 to 30th May 2019 and 1st March 2020 to 30th May 2020 were reviewed by two pre-trained study assistants. All health workers that were attached to the ANC clinic during the above study period filled the self-administered questionnaire if they consented. All records that were incomplete were to be excluded. Also health workers that were attached to the clinic by record but never attended were excluded. Consecutive recruitment was done in which all records for the study period which fulfilled the eligibility criteria were included. Also all health workers that were attached to the clinic during the study period were contacted.

2.3. Data collection procedure

All antenatal record books for the study period were reviewed. The social demographic information, clinical information and the services received by the mothers were filled in the data collection form. The total number of mothers that came for the ANC in both years were determined.

The duty rosters for the department of obstetrics and gynecology for the study period were obtained from the in-charge and the head of department. All health workers that were attached to the antenatal care clinic and their phone contacts were obtained. The health workers were contacted physically by the research assistants to set an appointment when they would fill the questionnaire since all were still staff of the

hospital. The questionnaire obtained information on gender, age, cadre, and the specific challenges faced (Appendix 1B). The time required to complete the self-administered questionnaire was less than 10 min. Before starting data collection, the questionnaire was pretested for validity and reliability, and adjustments made till the content validity index was 80 % and Cronbach's alpha was 80 %.

The information obtained was recorded in the data collection form that had an identification number and not the name in order to maintain confidentiality. The data collection forms are shown in Appendixes 1A and B. The data entered was checked twice by the principal investigator to ensure no mistakes were made.

2.4. Data analysis

The data obtained was summarized in excel sheets using Microsoft office excel. The summarized data was imported into Statistical Package for Social Sciences (SPSS Inc., Chicago, USA, version 22.0 for Windows). The percentage difference in antenatal care attendance between the two periods was computed. The percentage of patients that received a specific service in both years was computed and presented in a table to compare the difference in the two years. A chi-square test was used to assess whether the difference in the services offered was significant. A p value less or equal to 0.05 was considered significant. To determine challenges faced by the antenatal service care providers, the information obtained from the health care providers was coded and the proportion of health workers that stated a specific challenge was computed to determine the main challenges faced, and all challenges were presented in a bar graph.

3. Results

In this study, data of 2,379 clients that attended antenatal care was analyzed. No client data was excluded from the analysis, because all the data entries had the relevant data required for the study. The mean age was 28.3 (5.96) years, the mean weeks of amenorrhea was 27.4 (7.93) and the mean weight was 70.2 (11.3). Of the clients whose data was analyzed, majority were from Bushenyi district (76.3 %) and majority

Table 1
Characteristics of the study participants.

Characteristics	Statistic	
Age	Mean = 28.3, SD = 5.96, Min = 17.0, Max = 49.0	
Weeks of amenorrhea	Mean = 27.39, SD = 7.93, Min = 7, Max = 42	
Weight	Mean = 70.2, SD = 11.3, Min = 50.0, Max = 134.5	
	Frequency	Percentage
Month		
March	902	37.9
April	743	31.2
May	734	30.9
District		
Bushenyi	1814	76.3
Sheema	160	6.7
Mitooma	285	12.0
Ntungamo	31	1.3
Rubirizi	84	3.5
Others	5	0.2
Visit Number		
1st	709	29.8
2nd	684	28.8
3rd	580	24.4
4th	261	11.0
5th	110	4.6
6th	32	1.3
7th	3	0.1

SD = Standard deviation, Min = Minimum, Max = Maximum.

attended for the first (29.8 %) or second (28.8 %) visit (Table 1).

3.1. Percentage change in number of mothers attending antenatal care at KIU-TH between 2019 and 2020

This study showed that there was a 7.1 % reduction in the number of antenatal visits during the 2020 COVID-19 lock down period (Table 2).

3.2. Comparison of the services offered to mothers receiving antenatal care at KIU-TH between 2019 and 2020

We observed that there was a significant difference in fetal heart rate measurement using a pinard fetoscope for those mothers above 22 weeks and administration of intermittent preventive treatment (IPT) for those mothers above 16 weeks. The percentage of mothers in whom fetal heart measurement was not done was more in the 2020 period (2.0 % vs 0.0 %, p < 0.001). The percentage of mothers above 16 weeks that didn't receive IPT was more in the 2020 period as well (28.7 % vs 14.2 %, p < 0.001) (Table 3).

3.3. Challenges faced by antenatal care service providers during the COVID-19 lockdown period

According to the duty rota, only 4 health workers (all of whom were nurses) were allocated to the antenatal care clinic during the months of March to May in 2019 and March to May in 2020 and all the 4 were contacted physically by the research assistants and filled the questionnaire. The in-charge also responded to the questionnaire making the total number of respondents five. The commonest challenges faced by the service providers were failure to get transport means, fear of contracting COVID-19 plus too much work and exhaustion. These 3 challenges were reported by 100 % (5) of the respondents (Fig. 1).

4. Discussion

Percentage change in antenatal care attendance: This study revealed that there was a 7.1 % reduction in the number of antenatal care visits during the COVID-19 lock down period. Our findings are in agreement with a global observation by Semaan et al (Semaan et al., 2020) who reported that there was a widespread perception of reduced use of routine maternity care services, though the specific percentage reduction was not reported by Semaan et al. Our findings are also in agreement with reports from Kawempe National Referral Hospital (KNRH), during the 3 months lockdown where the number of antenatal attendances significantly decreased and remained below pre- COVID levels (Burt et al., 2021). Though other studies reported that antenatal care service utilization had decreased during COVID-19 period, the percentage reductions were not reported as was done in our study. This reduction in attendance can be attributed to the lockdown which was in effect at the period, and all the associated occurrences that were seen during the lock down period like bans on public and private transport, closure of businesses hence loss of income among others.

Comparison of the services offered to mothers receiving antenatal care: In this study, we observed that there was a significant difference in the fetal heart rate measurement for those mothers above 22 weeks and administration of intermittent preventive treatment (IPT) for

Table 2
Percentage change in number of mothers attending antenatal care at KIU-TH between 2019 and 2020.

Year	Number of visits	Percentage	Confidence interval	Percentage change
2019	1233	51.8	49.9–53.8	–7.1
2020	1146	48.2	46.2–50.1	

Table 3
Comparing the services offered in the two periods.

Service	Year 2019N (%)	Year 2020N (%)	RR(95 % CI)	chi-square P value
Blood pressure measurement				
Not Done	1(0.1)	4(0.3)	0.823	0.202
Done	1232(99.9)	1142 (99.7)	(0.428–1.583)	
Hemoglobin measurement (on the 1st visit)				
Not done	19 (5.3)	29(8.3)	0.929	0.134
Done	342 (94.7)	319 (91.7)	(0.825–1.046)	
Syphilis status				
Not known	3(0.2)	2(0.2)	1.060	1.000
Known	1230(99.8)	1144 (99.8)	(0.780–1.442)	
Hepatitis B status				
Not known	1026(83.2)	957(83.5)	1.004	0.869
Known	207(16.8)	189(16.5)	(0.968–1.041)	
Fetal heart measurement (for those >22 WOA)				
Done	915(100.0)	789(98.0)	1.354	<0.001
Not done	0(0.0)	16(2.0)	(1.336–1.373)	
IPT administration (for those >16 WOA)				
Given	960(85.8)	727(71.3)	1.149	<0.001
Not given	159(14.2)	292(28.7)	(1.115–1.184)	

All mothers had HIV test, abdominal palpation, edema check, iron/folic supply and used a mosquito net.

IPT = intermittent preventive treatment, N = number, %=percentage, WOA: weeks of amenorrhea, RR = Risk ratio, CI = Confidence interval.

those mothers above 16 weeks. Our findings are similar to what was reported in the UK where practice changes in some settings included reduction in personal contacts for tests and treatments (Horsch et al., 2020). This reduction of contact in fear of contracting COVID-19 could be the reason why a proportion of mothers above 22 weeks of amenorrhea did not have their fetal hearts listened to, yet in the year 2019, all mothers had the fetal hearts listened to.

Our study findings are similar to what was reported in Ethiopia where 114 (29.3 %) pregnant women had fully utilized antenatal care services during the pandemic period (Tadesse, 2020); meaning 70.7 % did not fully utilize the antenatal care services. However, in the Ethiopia study, the services not attained were not reported. The bigger proportion of mothers not receiving IPT could be explained by stock outs as were reported in Mulago by Burt et al (Burt et al., 2021) who observed that several shortages were noted in medication and vaccination availability during the pandemic period both pre-lockdown and post-lockdown, which may have affected the ability to deliver effective services during the period of the pandemic. Though other studies reported that there was interruption of antenatal care services, they did not specify which services were affected and the extent to which they were affected as was done in this study.

Challenges faced by antenatal care service providers: The commonest challenges faced were failure to get transport means, fear of contracting COVID-19 plus too much work and exhaustion. The other challenges included failure to connect with patients, suffocation caused by putting on masks for long, inadequate personal protective equipment (PPE) and pressure to learn new technology such as holding

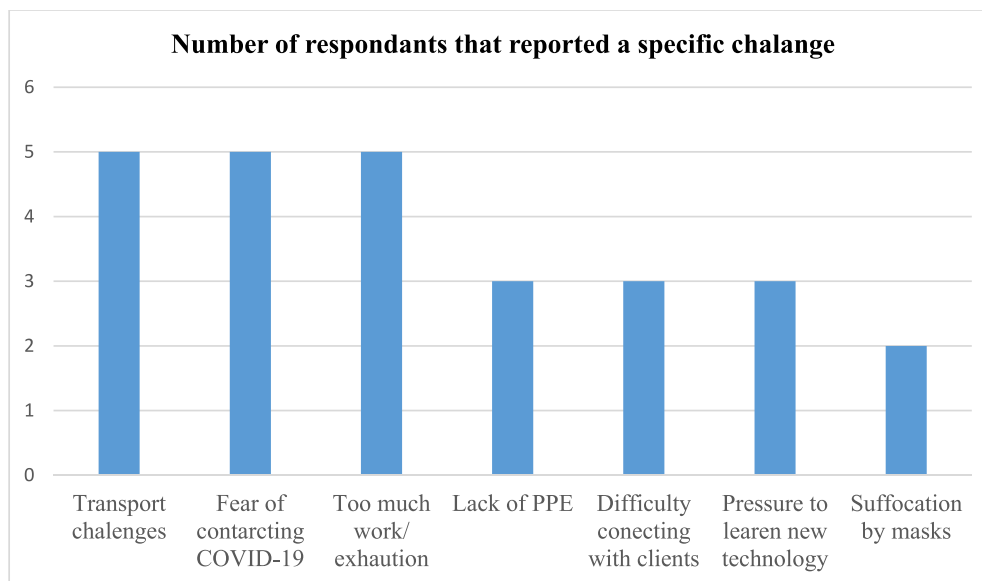


Fig. 1. Showing the challenges faced during the 2020 period of COVID 19 that were not experienced in the 2019 period.

departmental meetings via online platforms. Our findings are in agreement with what was reported by Hazfiarini et al (Hazfiarini et al., 2022) in Indonesia where midwives reported that increased workload was one of the challenges faced in offering antenatal care to mothers during the COVID-19 lockdown period. Also as was seen in Australia, concern about their own and family's health and safety in relation to COVID-19 was one of the challenges faced in the COVID period in our study (Id et al., 2021). Our findings are also in agreement with the reports from Nigeria, where it was observed that movement and cost barriers significantly affected antenatal care during the COVID period (Leung et al., 2022).

5. Study limitations

This study was a retrospective single centre study and therefore the generalizability of the findings is limited. Further, the challenges of ANC disruption documented in this retrospective review were limited to the acute phase of the outbreak (few days after the first case) when the health system was in shock which limits generalizability on how the results would turn out to be over the course of outbreak as the health systems stabilize. Therefore our findings do not reflect the situation of COVID period, but only reflects the study period. However, we hope that these findings will be a basis for future larger multicentre prospective studies.

Only 4 health workers were allocated to the antenatal clinic in both periods which limited the sample size from which we could get information about challenges faced by the service providers during antenatal care provision in the two periods. This also limits the generalization of the findings.

All mothers reported to be using a mosquito net. This might be a socially desirable response since these mothers receive free mosquito nets from the same health workers and any mothers reporting that does not sleep under a mosquito net would be considered irresponsible.

6. Conclusion

The percentage of mothers attending antenatal care was reduced in the COVID-19 lockdown period. The services that were significantly affected in the COVID-19 lockdown period were fetal heart measurement and administration of intermittent preventive treatment for malaria prophylaxis. The challenges faced by the service providers while offering antenatal care during the COVID-19 lockdown period included;

failure to get transport means, fear of contracting COVID-19, too much work and exhaustion, failure to connect with patients, suffocation caused by putting on masks for long, inadequate personal protective equipment and pressure to learn new technology such as holding departmental meetings via online platforms.

7. Recommendations

In the setting of outbreaks, measures should be put in place to ensure that antenatal services can be offered appropriately and safely without compromising the client nor the health care worker. We recommend further studies to look into the details of the ways that can be used to improve the antenatal services with in outbreaks, involving all stake holders.

Ethical considerations and consent.

All methods were carried out in accordance with relevant guidelines and regulations. Ethical approval was obtained from Kampala International University. Approval from the hospital administration of KIU-TH was obtained to allow for review of records. Informed consent was taken for all participants that filled questionnaires.

Author contribution

DA was the principle investigator, conceived and designed the study, collected data, analysed data and wrote the draft of the manuscript. JM participated in data analysis, discussion of results and revised the manuscript. JN and MN Contributed to discussion and revised the manuscript BT supervised the work, revised the manuscript and all authors approved the final paper.

CRediT authorship contribution statement

Diana Abeza: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Beckson Tayebwa:** Writing – review & editing, Supervision. **Joshua Muhumuza:** Writing – review & editing, Formal analysis, Data curation. **Majoreen Nabakka:** Writing – review & editing, Investigation. **Joseph Ngonzi:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijans.2023.100648>.

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