

The effect of the first wave of Covid-19 on use of maternal and reproductive health services and maternal deaths in South Africa

R Pattinson¹, S Fawcus², S Gebhardt³, R Niit⁴, P Soma-Pillay⁵, J Moodley⁶

¹ Professor Emeritus: SAMRC/UP Maternal and Infant Health Care Strategies Unit and Research Centre for Maternal, Fetal, Newborn and Child Health, University of Pretoria, Pretoria, South Africa

² Professor Emeritus and Senior Scholar, Department Obstetrics and Gynaecology, University Cape Town, Cape Town, South Africa

³ Professor and chief specialist University of Stellenbosch and Tygerberg Department Obstetrics and Gynaecology, Stellenbosch, South Africa

⁴ Project Manager Health Information Systems/Monitoring and Evaluation, Pretoria and Western Cape, South Africa

⁵ Professor and Head – Obstetrics, Department of Obstetrics and Gynaecology, University of Pretoria, Pretoria, South Africa

⁶ Professor Emeritus Department Obstetrics and Gynaecology, University Kwa Zulu Natal, Durban, South Africa

Summary

Aim: To monitor the impact of the first wave of the Covid-19 pandemic on use of maternal and reproductive health services, and maternal mortality.

Method: Data from the District Health Information System (DHIS) was used and 2020 data compared with 2019 as a control. Visits for initiating antenatal care, termination of pregnancy services, contraceptive use and births in facilities were used to assess usage of maternal and reproductive health services; and number of maternal deaths to assess impact. A descriptive analysis of pregnant women who had delivered after having confirmed Covid-19, was performed from the NDoH/SAMRC/UP national monitoring database of Covid-19 in pregnancy, which deals only with public hospitals.

Results: There were more births each month in facilities in 2020 than 2019 although there was a decline in lockdown stage 5. There was a marked movement of pregnant women to the more rural provinces and districts for delivery. Use of antenatal care as measured by the number starting antenatal care remained relatively steady, but with pregnant women attending clinics later than usual. Use of reproductive health services (contraceptive and termination of pregnancy) declined markedly. There has been a marked increase in maternal deaths of 30% (an excess of 132 maternal deaths) since lockdown started when compared with the same period in 2019. There have been 667 women reported who have delivered having had Covid-19 in the NDoH/SAMRC/UP database. Twenty-nine maternal deaths (case fatality rate 4,3%) were recorded, and 22 stillbirths and 16 neonatal deaths (perinatal mortality rate 57 per 1000 births). The caesarean delivery rate was 55%, prevalence of hypertensive disorders in pregnancy 14%, but spontaneous preterm labour only 3%. There has been a 20% increase in stillbirths in Mpumalanga after lockdown (second quarter 2020 when

compared with the second quarter of 2019), but in many provinces there were discrepancies between DHIS and PPIP data so national still birth data is not presented in this report

Conclusion: There has been an increase of 30% in maternal deaths since lockdown started and the epidemic peaked in 2020, compared with the same period in 2019. Use of maternal services (in facility birth and antenatal care) has remained relatively steady, but use of reproductive health services (contraception and termination of pregnancy) have declined sharply since lockdown. There has been two markedly different regional effects of Covid-19 on maternal care; the rural provinces experiencing increased pressure on their services due to pregnant women migrating from metropolitan areas back to their homes, increasing the burden on already under-resourced facilities; and metropolitan areas were inundated with severe Covid-19 specific conditions leading to an increased burden in these areas resulting in an inability to manage routine emergencies.

Interpretation: It is very unlikely that the majority of excess maternal deaths are due to undiagnosed SARS-Cov-2 infection and much more likely that the deaths are due to the indirect effects of Covid-19 on maternal care services.

Introduction

South Africa has a routine data system (the District Health Information System - DHIS) that collects data on the usage and outcome of the various services on offer in the public sector. Further, as the seriousness of the Covid-19 pandemic became apparent to the world, extra data systems were created to monitor the impact on the services, its impact on mortality and to describe the disease in a South African context. Guidelines were developed for screening and managing pregnant women for Covid-19 and guidelines for maternity staff for use of personal protective equipment (PPE) and health care messages for pregnant women were distributed.

Robertson et al¹, had warned of an 8,3% - 38,6% per month potential increase in maternal mortality for low-and middle-income countries if routine and emergency services were not maintained by the health system

Correspondence

R Pattinson

email: Robert.pattinson@up.ac.za

or used by pregnant women. This report examines the usage of maternal services and the impact on mortality for the first quarter of the year, before Covid-19 lockdown, and the next two quarters after Covid-19 lockdown and when the first wave of the pandemic peaked in South Africa. The first wave of SARS-CoV-2 infections had ended by the end of September, and the lessons learnt from the first wave have been summarised for future use. Data on perinatal deaths was not considered due to discrepancies between the DHIS and PPIP data sources. This is a shortened version of the report submitted to the National Department of Health. A copy of that report can be obtained from the SAMRC/UP maternal and infant health care strategies unit from Mrs Bezuidenhout (cathy.bezuidenhout@up.ac.za)

Method

Data from the DHIS was used and 2020 data compared with 2019 as a control. The difference between 2020 and 2019 was used; a positive value indicates more cases in 2020 and a negative value indicates less cases in 2020. Visits for initiating antenatal care, termination of pregnancy services, contraceptive use and births in facilities were used to assess usage of maternal and reproductive health services; and number of maternal deaths used to assess impact.

Validated data was only available from the DHIS up to end September 2020. The causes of maternal deaths are not recorded on the DHIS. Further a specific monitoring system was set up by the National Department of Health (Maternal Health division) and the SAMRC/UP Maternal and Infant

Health Care Strategies Unit to assess the effect of Covid-19 on pregnancy. This monitoring system collected information on all women who had confirmed Covid-19 disease in pregnancy and who delivered, irrespective of the outcome. Only data on women who delivered in public hospitals was collected. It also included maternal death, stillbirth and neonatal death data.

Data is presented first for the country and then for the provinces and metropolitan areas and some large districts. Data is presented as Figures with some Tables. More comprehensive data in the form of tables can be found in the full report which appears in the Combined Executive summary of Saving Mothers and Saving Babies report 2017-2019, DOH, Pretoria 2020

Results

Most of the data was analysed per quarter and comparisons made between 2019 and 2020; Quarter one (Q1) was January to March, quarter two (Q2) April to June and Quarter three (Q3) was July to September. Figures one and two show the trends in facility births per quarter. There has been an increase in live births in 2020 compared with 2019, but the increase was far less in the second and third quarters, (after lock down). It is possible that there was an increase in home births during this period, but data on this is not available. The provincial and metropolitan data shows that there has been a large migration back to rural areas during the pandemic. Perhaps this was due to unemployment and a wish to be close to one's family.

Births increased in all area except eThekweni which decreased (which

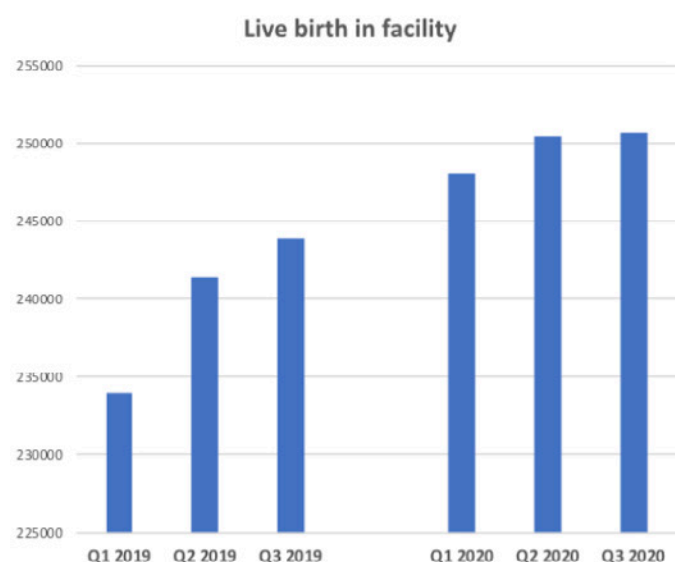


Figure 1. Live births in facility per quarter

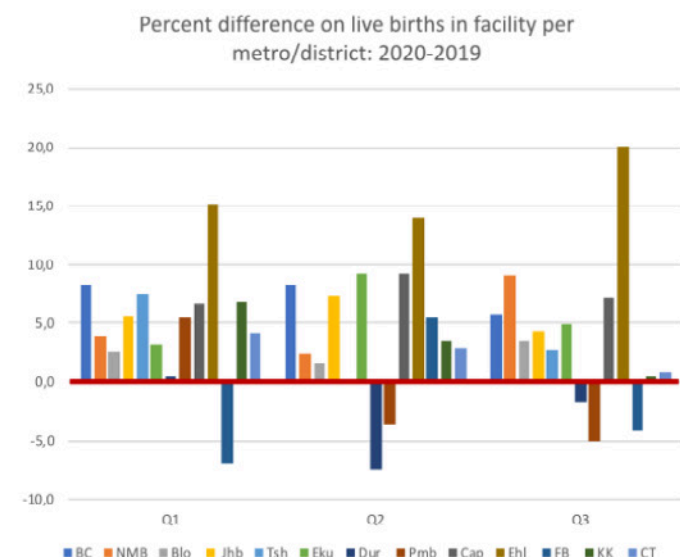
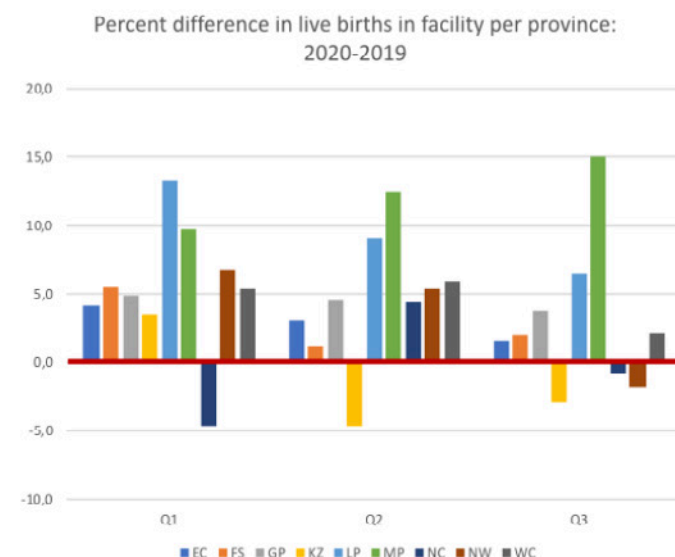
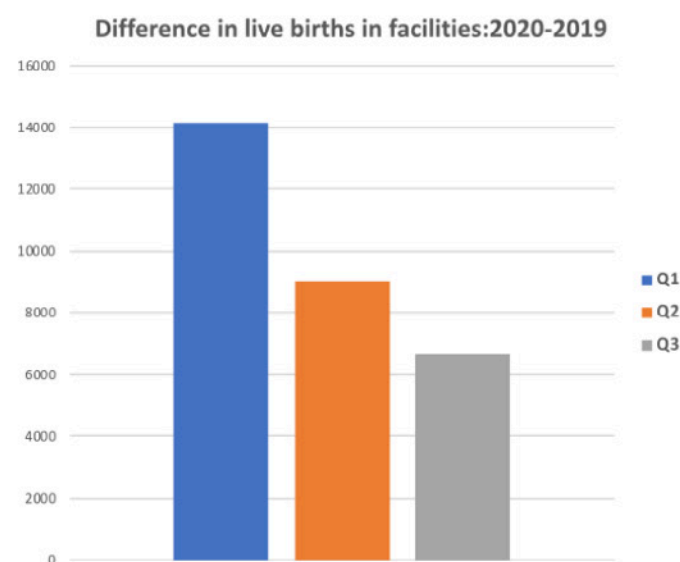


Figure 2. Percent difference in live births in facility per quarter: 2020 - 2019

A SUMMARY

O&G Forum 2020; 30: 36 - 44

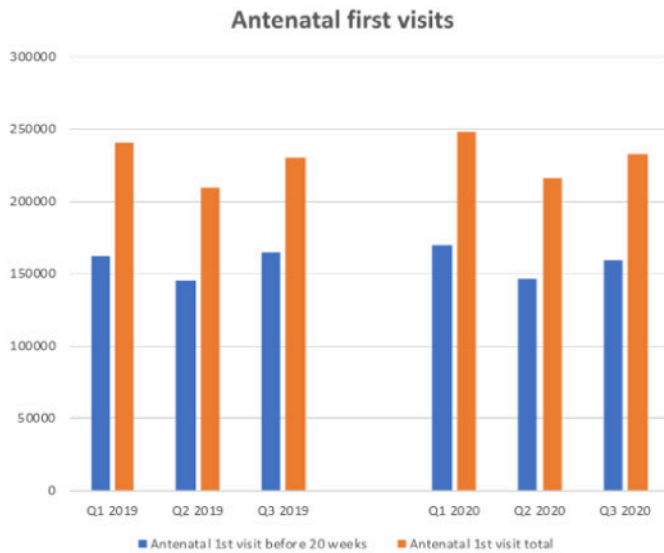


Figure 3. Antenatal Care

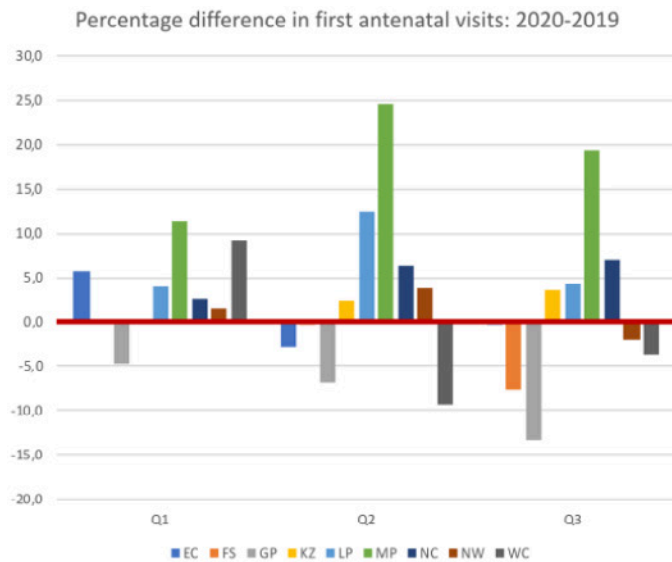


Figure 4. Percentage difference in antenatal first attendance per quarter: 2020 - 2019

might be explained by a migration to the rural areas in KZN) or home births.

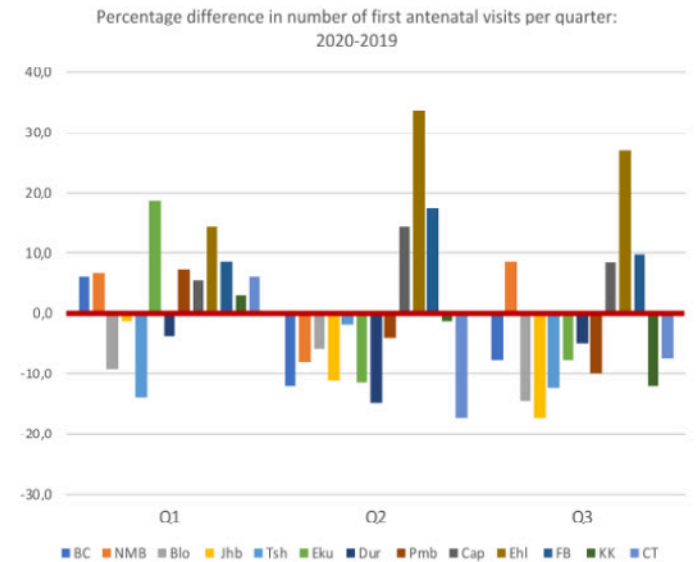
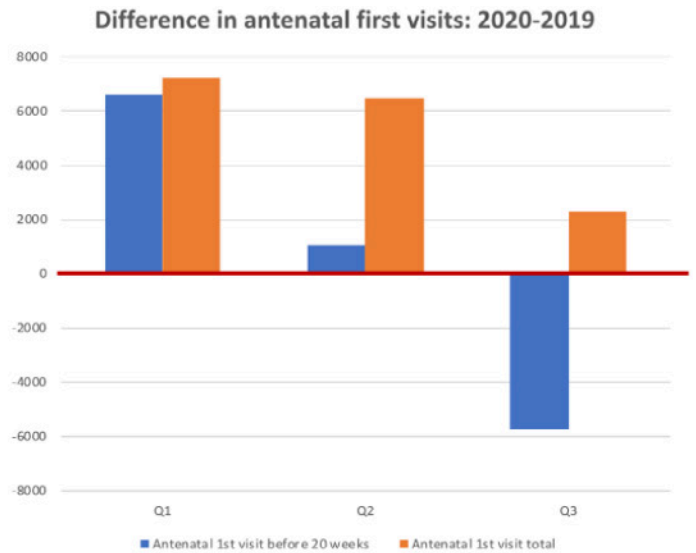
The difference in antenatal visits for initiation of antenatal care between 2020 and 2019 is shown in figure 3. From the monthly data, there was a considerable dip when lockdown started (in April) and a recovery in May and June, but a severe decline for July when the magnitude of the pandemic became apparent in South Africa. However overall, antenatal care first visit attendance increased all three quarters, but it seems women were delaying their first visit as the first visits before 20 weeks gestation were less than 2019 in Q3, and the number of increased visits were much smaller in Q2 (Figure 4). However for all visits the numbers of visits were more in 2020 than 2019, but the increase much less in Q2 and Q3.

There appears to have been a migration from urban to rural areas during lockdown for Q2 and Q3, suggested by the increase in antenatal care first visits in the rural provinces, mostly Mpumalanga, Limpopo and Northern Cape, with North West and KwaZulu-Natal having mixed results. The metropolitan areas had a marked decrease in first antenatal visits.

The data shows that women continued to attend antenatal care and deliver in facility during lockdown, but in different places.

Contraceptive visits declined in all areas in the second and third quarters of 2020. Figures 5 and 6 show the difference in numbers of visits for contraceptives between 2020 and 2019.

Figure 7 and 8 give the usage of services for termination of pregnancy (TOP) nationally and by province. There has been a steady decline in the



use of TOPs in the second and third quarters of 2020, except in the City of Johannesburg where it increased markedly.

Summarising data on reproductive services; figures 5 to 8 show that visits for contraceptive services and termination of pregnancy dropped in both quarters in the majority of areas after lockdown in April 2020.

Table 1, Figure 9 and Figure 10 show the difference between the number of maternal deaths before and after lockdown and the difference between 2020 and 2019. 2019 was the first year since the confidential enquiries in maternal deaths started in 1998 that the institutional Maternal Mortality Ratio (iMMR) fell below 100/100000 live births. This trend in the reduction of maternal deaths continued in the first quarter of 2020 with a 13% reduction in number compared with the first quarter of 2019.

Figures 11 shows the iMMR nationally and by province for the three quarters in 2020 compared to 2019; and Figure 12 presents the corresponding monthly iMMR data. The iMMR increased in all areas after lockdown, from April 2020 up to August 2020.

Description of women with Covid-19 in pregnancy

The NDoH/SAMRC/UP database has recorded 667 pregnant women who have delivered in the public sector following confirmed SARS-Cov-2 infection.

Figure 13 shows the distribution of the cases reported. The cases reported follow the provinces with the highest number of infections. Table 2 provides clinical data on the cases.

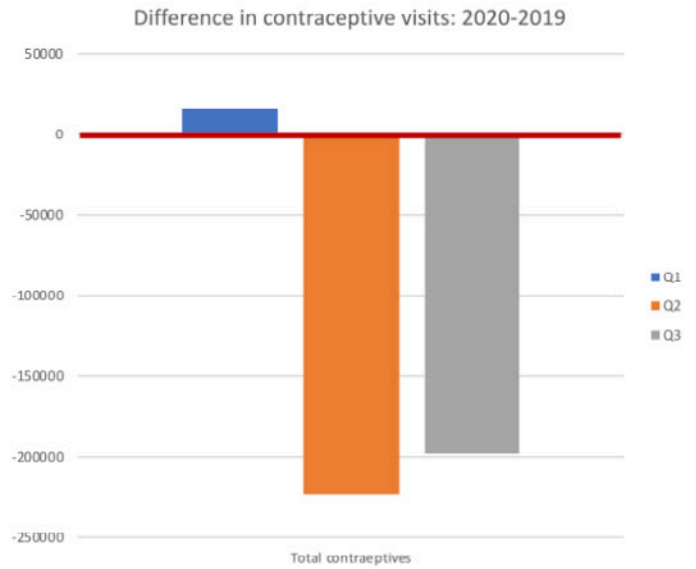
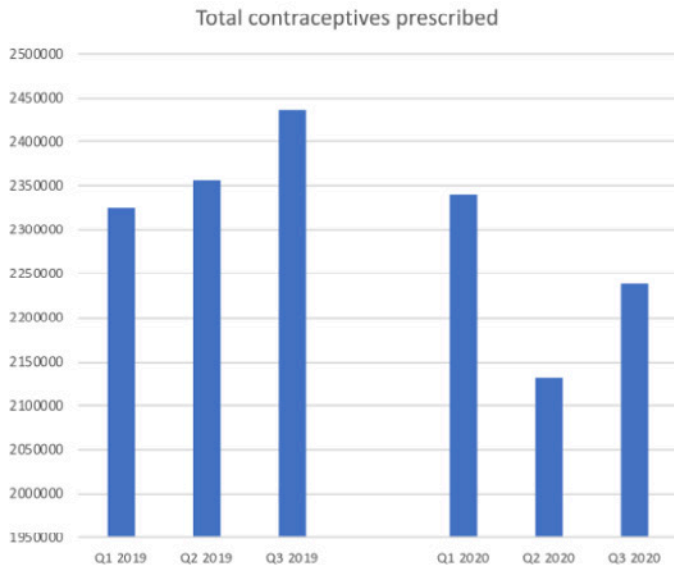


Figure 5. Contraceptive use

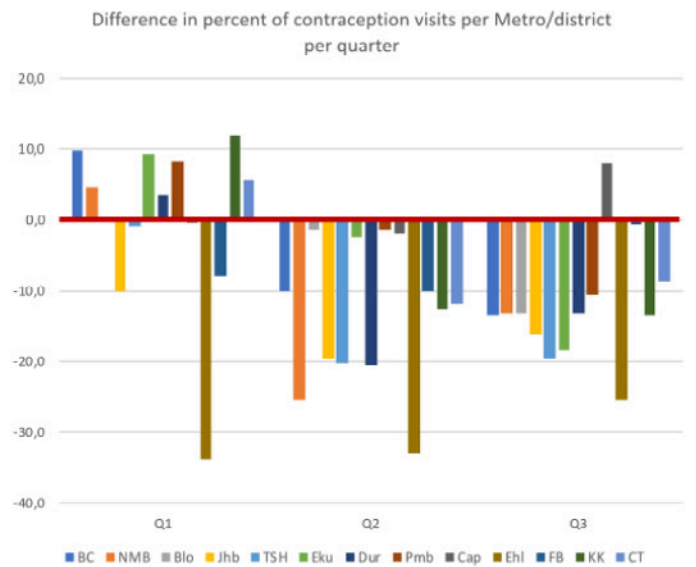
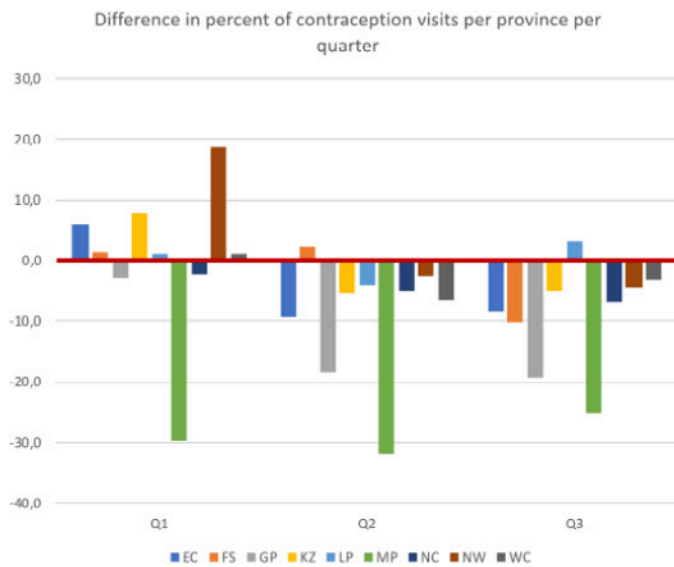


Figure 6. Percent difference in contraceptive visits: 2020 - 2019

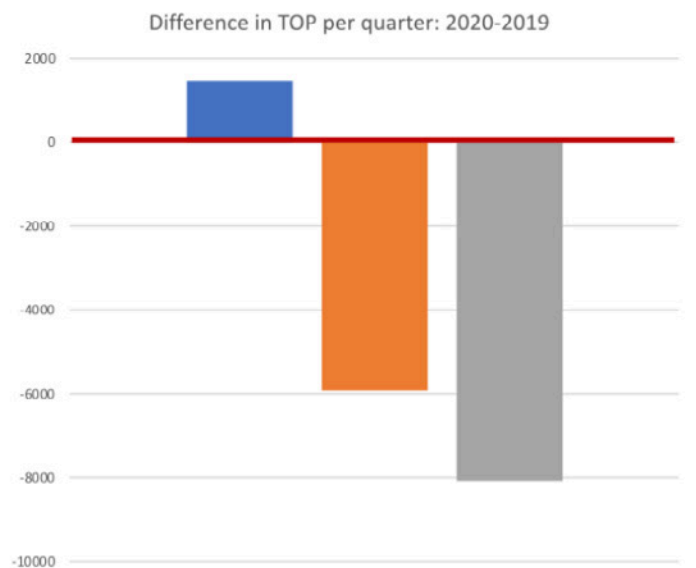
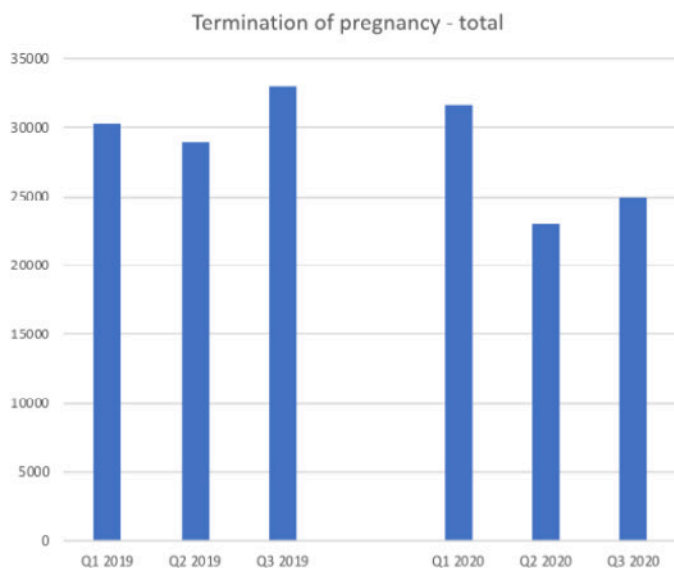


Figure 7. Termination of pregnancy

A SUMMARY

O&G Forum 2020; 30: 36 - 44

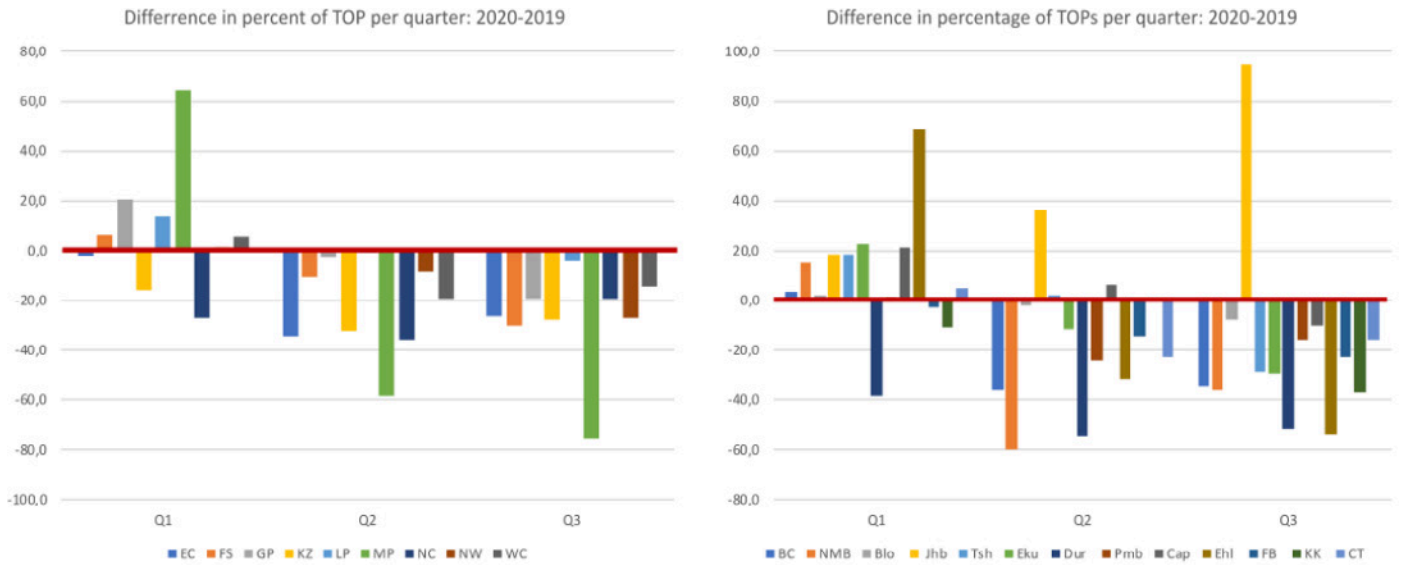


Figure 8. Percentage difference in TOPs per quarter: 2020 - 2019

Table 1. Maternal deaths before and after lockdown at end March		
	Number	Difference
Total deaths Jan - Mar 2019	270	
Total deaths Jan - Mar 2020	235	-35
		-13.0%
Total deaths April - Sep 2019	441	
Total deaths April - Sep 2020	572	132
		30.0%

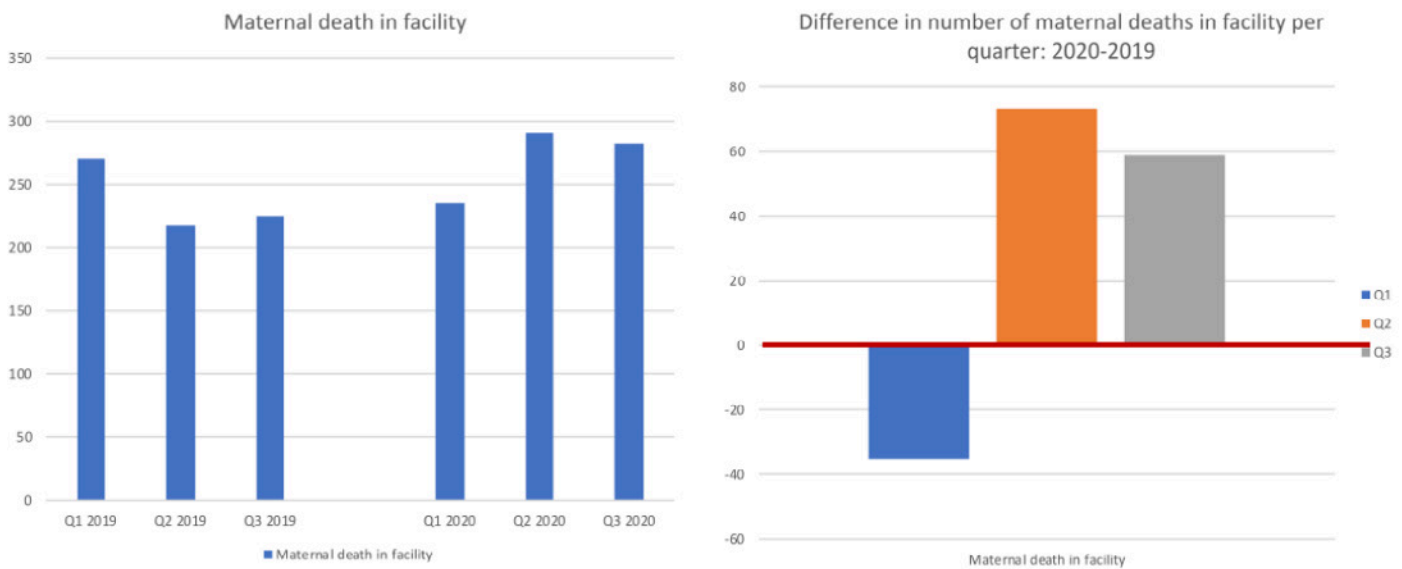


Figure 9. Maternal deaths

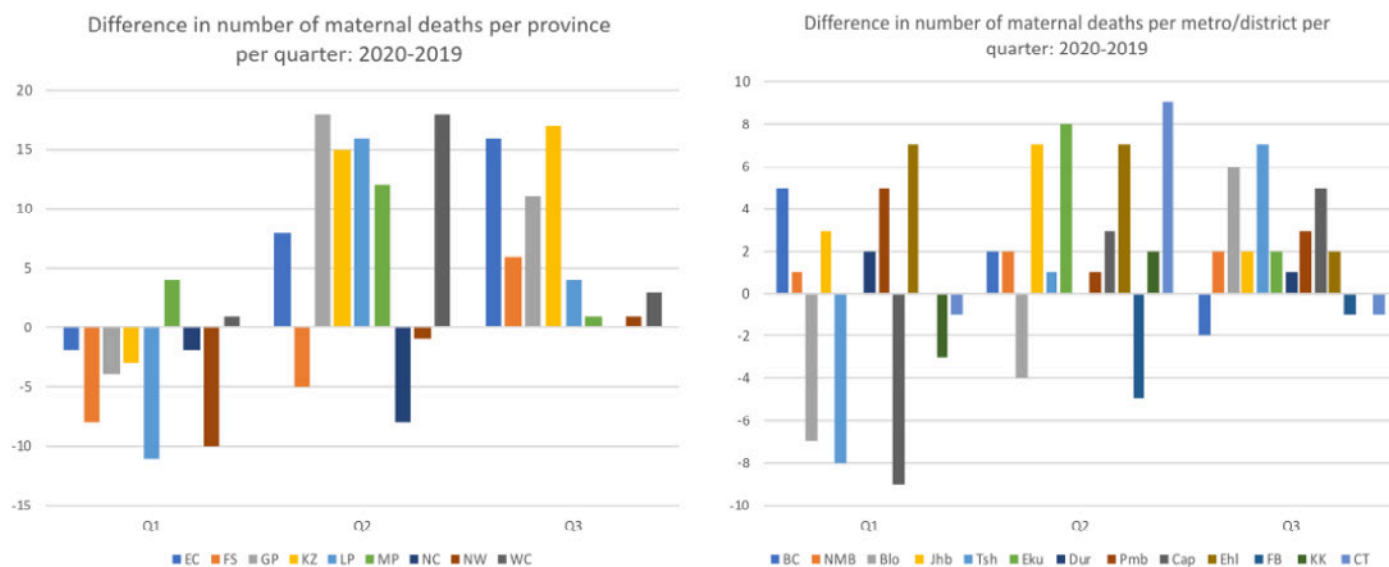


Figure 10. Difference in number of maternal deaths

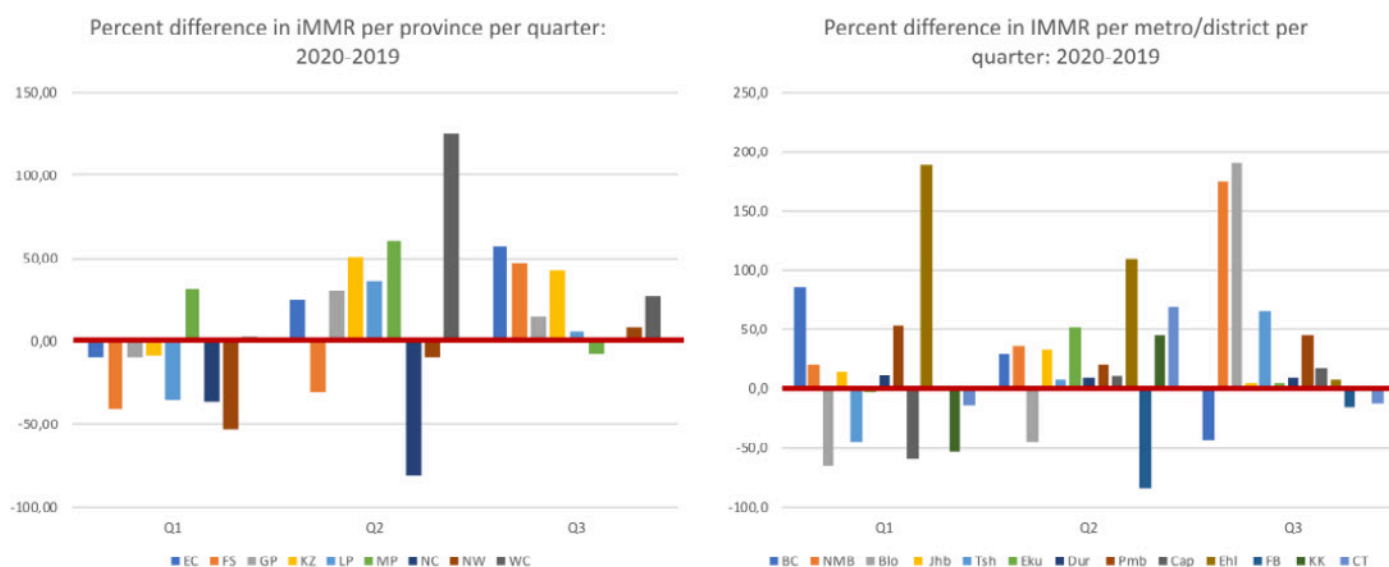


Figure 11. Percentage difference in iMMR per quarter: 2020 - 2019

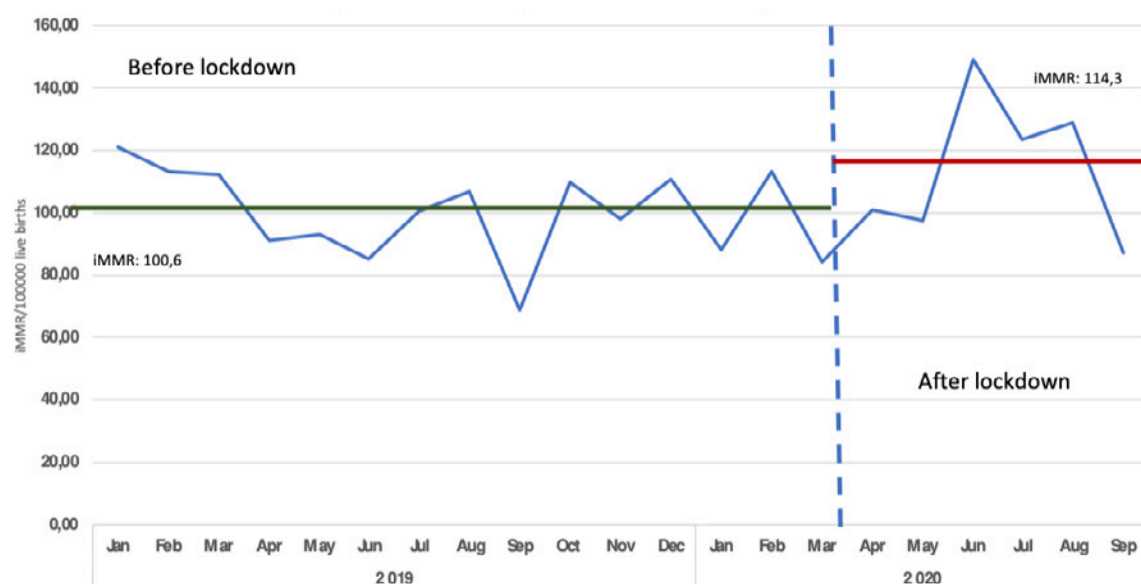


Figure 12. Monthly iMMR: Jan 2019 - Sept 2020

A SUMMARY

O&G Forum 2020; 30: 36 - 44

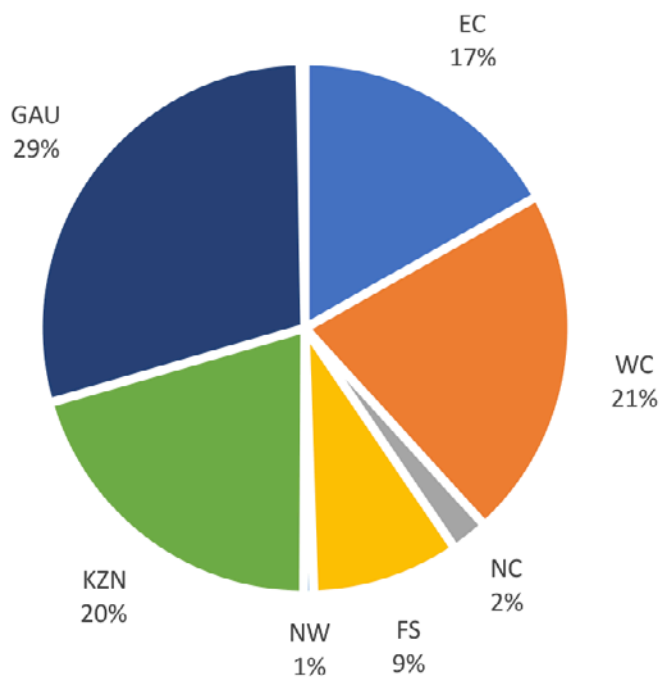


Figure 13. Provincial distribution of cases submitted

Table 2. Pregnancy care and outcomes of women delivering who has Covid-19 in pregnancy			
Forms	Total	667	100%
Antenatal care			
	Yes	581	87.11%
	No	31	4.65%
	Unknown	55	8.25%
Maternal age			
	<18y	17	2.55%
	18-35y	469	70.31%
	>35y	176	26.39%
Parity			
	0	123	18.44%
	1-5	520	77.96%
	>5	23	3.45%
Delivered at this facility			
	Yes	584	87.56%
	No	17	2.55%
	Unknown	66	9.90%
GA at birth			
	<30 weeks	59	8.85%
	30-34 weeks	111	16.64%
	35-36 weeks	95	14.24%
	37-41 weeks	357	53.52%
	>=42 weeks	11	1.65%
	Unknown	34	5.10%
Birthweight			
	>= 2500g	478	71.66%
	1500 - 2499g	126	18.89%
	1000 - 1499g	23	3.45%

	<1000g	4	0.60%
	Unknown	28	4.20%
Gestation			
	Singleton	616	92.35%
	Multiple	-4	-0.60%
	Unknown	30	4.50%
Mode of delivery			
	Normal vertex delivery	265	39.73%
	Vaginal breech delivery	6	0.90%
	Assisted vaginal delivery	7	1.05%
	Caesarean section before labour	212	31.78%
	Caesarean section during labour	152	22.79%
	Unknown/Not recorded	23	3.45%
Condition at birth			
	Born alive	604	90.55%
	Stillborn, alive on admission	4	0.60%
	Fresh stillborn, dead on admission	10	1.50%
	Stillborn, admission status unknown	0	0.00%
	Macerated stillborn	8	1.20%
Syphilis			
	Negative	267	40.03%
	Positive	12	1.80%
	Unknown	386	57.87%
HIV			
	Negative	450	67.47%
	Positive, on long term ART	180	26.99%
	Unknown	16	2.40%
Maternal obstetric condition			
	Hypertension/pre-eclampsia/eclampsia	81	12.14%
	Gestational diabetes	9	1.35%
	Spontaneous preterm labour	18	2.70%
	Premature rupture of membranes	9	1.35%
	Antepartum haemorrhage	4	0.60%
	Postpartum haemorrhage	0	0.00%
	Puerperal sepsis	1	0.15%

	Pneumonia/ARDS	10	1.50%
	Not recorded	227	34.03%
	Other:	308	46.18%
Health systems usage: mother			
	Admitted to high-care unit	56	8.40%
	Admitted to ICU	18	2.70%
	Intubated & ventilated	2	0.30%
	Death	29	4.35%
	Not recorded	381	57.12%
	Duration of hospital stay unknown	382	57.27%
	Duration of hospital stay 1-2 days	58	8.70%
	Duration of hospital stay 3-7 days	130	19.49%
	Duration of hospital stay >7 days	92	13.79%
Neonatal morbidity			
	Respiratory distress syndrome	44	6.60%
	Meconium aspiration syndrome	3	0.45%
	Hypoxic-ischemic encephalopathy	0	0.00%
	Necrotising enterocolitis	0	0.00%
	Intracranial Haemorrhage	0	0.00%
	Congenital abnormality	1	0.15%
	Neonatal sepsis	2	0.30%
	Not recorded/None	405	60.72%
	Other:	212	31.78%
Health systems usage: baby			
	Stayed with the mother	195	29.24%
	Discharge to interim caregiver	5	0.75%
	Admitted to neonatal nursery	87	13.04%
	Admitted to high-care unit	12	1.80%
	Admitted to ICU	37	5.55%
	Intubated & ventilated	0	0.00%
	Death	16	2.40%
	Not recorded	162	24.29%
	Duration of nursery admission unknown	466	69.87%
	Duration of nursery admission 0 days	42	6.30%
	Duration of nursery admission 1-3 days	69	10.34%
	Duration of nursery admission 4-7 days	43	6.45%
	Duration of nursery admission >7 days	47	7.05%

A large proportion of babies that have been delivered were low birth weight (approximately 23,4%). There were 29 maternal deaths (case fatality rate 4,3%) and 22 stillbirths and 16 neonatal deaths (PNMR 57/1000 births). The caesarean delivery rate was 55%, prevalence of hypertensive disorders in pregnancy 12%, but spontaneous preterm labour only 2,7%. This descriptive data must be treated with caution as it can be potentially falsely high or low because number of women who have had Covid-19 but have not yet delivered.

The peak prevalence of maternal deaths was in June, a month before the peak in the mortality in the general population (July).²

Discussion

This report demonstrates that there has been a significant increase in maternal deaths after lockdown started and the surge of the pandemic. This has been associated with a decrease in usage of reproductive health services but relatively stable use of maternity services (antenatal care and in facility births). The number of births in public health facilities per month was greater each month than in 2019, except for KwaZulu-Natal, where there was a decrease in in-facility births. There was a marked movement of pregnant women to the more rural provinces especially Mpumalanga and Limpopo provinces during lockdown and due the first wave of the pandemic as evidenced by a marked increase in first antenatal visits and births especially in Mpumalanga and Limpopo. It is also possible that there was a trend to more home births, especially in Kwa Zulu Natal. The increase in maternal deaths was noted across all areas (provinces, metropolitan areas and large rural districts).

The NICD DATCOV database reported in mid-August that there had been 1342 pregnant women who had tested positive for SARS-Cov-2 virus and 24 of these had died. This database collects data from both public and private laboratories. The NDoH/SAMRC/UP database for monitoring the effects of Covid-19 in pregnancy in South Africa reported 667 women with Covid-19 in mid-November 2020 that had given birth and 29 maternal deaths in this group. This database only records information at birth and only from women giving birth in public facilities. The MBRRACE-UK Rapid Report³ on Covid-19 in pregnancy reported 9 maternal deaths related to Covid-19 in pregnancy, 7 direct deaths and in 2 Covid-19 was incidental to the death. This was out of 162344 pregnancies over 3 months; March to May 2020. It is too soon to evaluate the effect of Covid-19 in pregnancy, but the case fatality rate and the perinatal mortality rate for this subset of women who were diagnosed with Covid-19 is high. It is possible it is high because all the women with severe disease have delivered early and with time (as more women deliver after recovering from Covid-19) the mortality rates will drop.

There is likely to be under reporting of Covid-19 infections in pregnancy as not all women are tested, and there might be under-reporting of maternal deaths that tested positive for Covid-19. Bradshaw et al² considers that there might be twice as many deaths from Covid-19 as report, so even if the number of maternal deaths directly related to the SARS-CoV-2 virus is double to 58, it is still far less than the extra 132 maternal deaths observed. Thus, it is very unlikely that the excess maternal deaths reported after lockdown was initiated are all due to undiagnosed Covid-19 infections. Given the changed usage of maternal care services and the underutilisation of reproductive health services, it is highly likely that a major proportion of the deaths are due to the indirect effects of Covid-19 of which Robertson et al.¹ warned. The reduced usage was probably due to a combination of reduced transport available to clinics and reduced utilisation by women scared of contracting the virus in health facilities, but also due to reduced provision of maternal and reproductive health services. This was a consequence of diversion of staff and services towards Covid-19 care, staff sickness or quarantine, and the challenges in maintaining essential services.

It is this area which must be addressed in preparation for a potential second wave or another public health crisis.

A SUMMARY

O&G Forum 2020; 30: 36 - 44

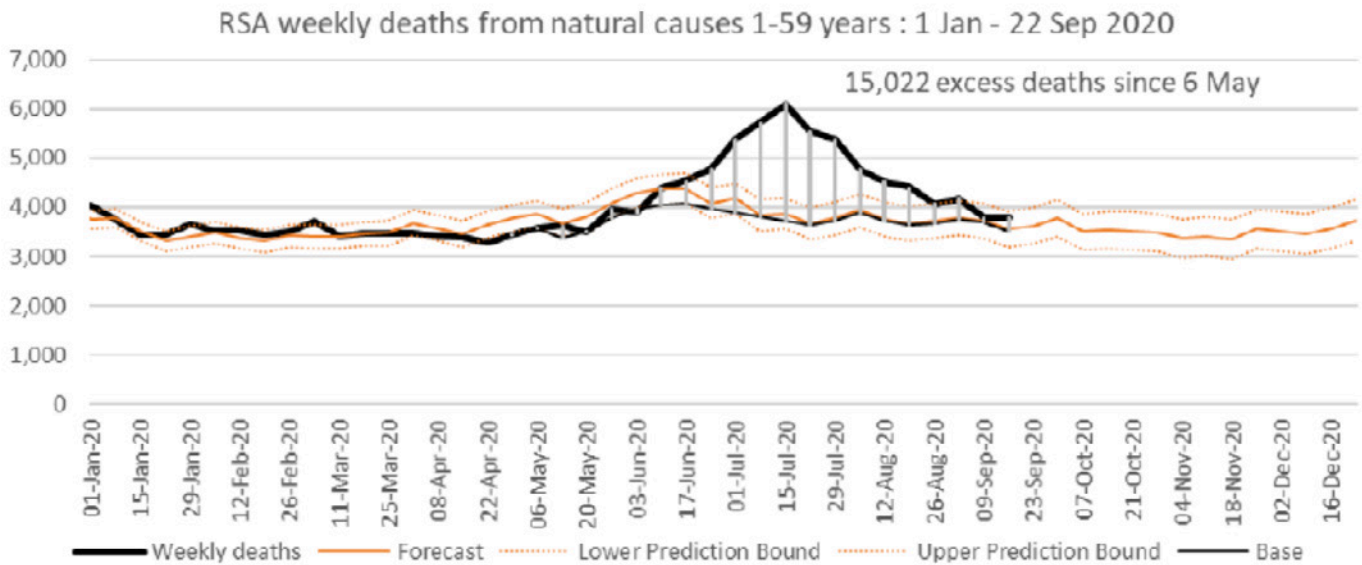


Figure 14. Weekly deaths in South Africa (Burden of Disease Research Unit South African Medical Research Council 29 September 2020)

Conclusion

There has been an increase of 30% maternal deaths till end September 2020 compared with 2019 since lockdown started in South Africa. It is very unlikely that the increased mortality is due to undiagnosed Covid-19 and much more likely the deaths are due to the indirect effects of Covid-19 on maternal and reproductive health services. Use of reproductive health services (contraception and termination of pregnancy) have declined sharply since lockdown, but in-facility births increased as did antenatal attendance for first visits but with women starting antenatal care later. There was a migration of pregnant women to the more rural provinces, especially Limpopo and Mpumalanga provinces.

There has been a two markedly different effects of Covid-19 on maternal care; the rural provinces experiencing excess pressure on their services due to pregnant women migrating from metropolitan areas back to their homes, increasing the burden on already under-resource facilities; and metropolitan areas were inundated with severe Covid-19 specific conditions leading to an increased burden in these areas resulting in an inability to manage routine emergencies. The preparation for future responses will need to be targeted at solving these different issues.

Recommendations

The underlying causes of the of maternal deaths should be established as soon as possible. The data collected and analysed by the National Committee for the Confidential Enquiries into Maternal Deaths would be important to rapidly allocate the pathological cause of the deaths for 2020 and calculate the proportion due to or associated with Covid -19.

In the meantime, it is essential to:

- Ensure basic maternal and reproductive health services remain open and functioning
- Ensure adequate means of transport to and between health care facilities
- Ensure health care providers are adequately protected with PPE and are provided with emotional support
- Ensure health care facilities provide adequate protection for pregnant women attending routine services

- Ensure pregnant women know they should still attend for antenatal care
- Ensure women in the reproductive age know that they should still attend for contraception and TOP services. Consideration should be given to promoting long acting reversible contraceptives as they would obviate the need to visit the clinics regularly.

In the near future, efforts must be made to make the primary care clinics and maternity health facilities more resilient to health crises. This will have to include ensuring the rural facilities are better equipped to manage an influx of patients from outside their areas and metropolitan areas. Further, intensive care facilities in metropolitan areas will need to be increased to manage severe disease resulting from the epidemic. The expansion of numbers of community health workers announced in the mid-term budget could assist in CHWs not only doing Covid-19 related work, but also encouraging women in reproductive health age group to attend for maternal and reproductive health care.

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