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Antenatal visits and obstetric outcomes during nationwide COVID-19 lock down period in a tertiary hospital of Nepal

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Abstract

Introduction: Maternity services were disrupted during nationwide COVID-19 lock down period. This study aimed to evaluate the impact of nationwide COVID-19 lock down on antenatal visits and obstetric outcomes in a tertiary hospital of Nepal.

Method: A study was conducted at Patan hospital, Nepal with regard to antenatal visits and obstetric outcomes during COVID-19 lockdown period (24th March to 14th June 2020) and was compared to non COVID-19 period (24th March to 14th June 2019). A Chi-square test was used to determine the association between the outcome variables. The data was taken as statistically significant when the p-value was <0.05.

Result: A total of 4,157pregnant women visited antenatal clinic (ANC) during nationwide COVID-19 lock down period while 7,029 patients visited during same period a year back (non COVID-19 period) which is a 40.86 percentage decline. There was significant reduction in deliveries during COVID-19 lock down period (1604 during non COVID-19 and 1140 deliveries during COVID-19 lockdown period respectively) but mode of delivery was similar. Maternal complications like postpartum hemorrhage (PPH), intensive care stay (ICU), sepsis and cesarean hysterectomy were similar during both the period.

There was a significant reduction in preterm deliveries during COVID-19 lock down period (13 during non COVID-19and 8.7 percentage during COVID-19 period respectively). However, early neonatal sepsis (EONS) was significantly higher during COVID-19 lock down period.

Conclusion: While, there was a significant reduction in preterm births and increase in early neonatal sepsis during COVID-19 lockdown period, there was no difference in maternal outcome.

Keywords: COVID-19, lockdown, preterm births

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Introduction

Corona virus disease 2019 (COVID-19) caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2).[1] It was first identified in Wuhan, China, in December 2019.[2] The first case of COVID-19in Nepal was reported on 25 Jan 2020.[3] The World Health Organization (WHO) declared COVID-19as pandemic on 11 Mar 2020.[4] Though the total confirmed COVID-19 cases in Nepal till 24 Mar 2020 before lockdown were only two,[5] the Government of Nepal enforced a complete nationwide lock-down from 24 Mar 2020 to 14 Jun 2020[6] with subsequent easing starting from 15 Jun 2020 onwards.[7] COVID-19 lockdown was a measure taken by the government to prevent the spread of the virus. It included complete prohibitions on public movement and all non-essential transport and services. Majority of peripheral health facilities were closed and routine essential health services were disrupted. This inadvertently led to a drastic limitation on access to essential and routine health care services. Maternity services were disrupted nationwide as were other essential services, putting the lives of the pregnant women at peril. The COVID-19 lockdown significantly impacted pregnant women's access and utilization of key services like antenatal care and safe childbirth, which are the cornerstone in decreasing maternal and perinatal mortality and morbidity.

This study aimed to study the impact of the nationwide COVID-19 lock down on antenatal visits and the obstetric outcomes at Patan Hospital. The insight gathered from this study could help formulate strategic planning for future outbreak responses in similar contexts.

Method

This is a descriptive cross sectional study which was conducted in the Department of Obstetrics and Gynecology, Patan Hospital, Patan Academy of Health Sciences (PAHS), Nepal. Maternal and perinatal outcomes were compared between the first phase of national lockdown period and the same time period a year before the Covid lockdown.

Data were collected from 24 Mar 2020 to 14 Jun 2020 (COVID-19 lockdown period) and from 24 Mar 2019 to 14 Jun 2019 (non COVID-19 period). All women seeking antenatal care at Patan Hospital, all institutional deliveries and newborn delivered during the 1st lockdown period and the year before, were included.

The ethical approval was obtained from the Institutional Review Committee (IRC)-PAHS before the commencement of the study (Approval No. Ref: drs2007211400). Total number of patients who visited ANC clinic were calculated from ANC register and the total number of delivery were calculated from delivery register logbook during COVID-19 lockdown period and non COVID-19 period. The hospital number of each delivery case was noted to retrieve the medical files from the record section department. Data regarding ANC visits, mode of deliveries, maternal outcomes including postpartum hemorrhage (PPH), intensive care unit (ICU) admission, sepsis, cesarean hysterectomy or maternal deaths and fetal outcomes like live birth, early neonatal sepsis (EONS) and early neonatal death were collected and recorded in the prepared sheet. The data were compared between Covid-19 lockdown period and non Covid-19 period.

Data were analyzed using SPSS version 20. Mean (standard deviation) and median (inter quartile range) were used for continuous data, proportion and percentage for the nominal data and Chi-square tests and odds ratio for inferential data. Chi-square test was used to determine the association between the outcome variables. The data was taken as statistically significant when the p-value was <0.05.

Result

During the nationwide lockdown period, 4157 pregnant women visited our ANC outpatient

department whereas 7029 pregnant women had visited in the same period a year back during non COVID-19 period which is a 40 percent reduction, Figure 1. There were total of 1140 deliveries during COVID-19 lock down period while 1604 deliveries occurred during the non COVID-19 period which is 28 percentage fall.

Most of the woman belonged to age group of 20-35 y. During the lock down period, 1091(95.8%) of the patients who delivered at our institution had regular antenatal care. More than 90 percent (1040) of them delivered at term and half of the patients had cesarean section (Table 1).

Delivery before term (less than 37 weeks) was reduced significantly during COVID-19 lockdown period when compared to those delivered during non COVID-19 period, 209(13%) and 100(8.7%) during non COVID-19 and during COVID-19 lockdown respectively (Table 2).

The crude rate of cesarean section is an important global indicator for measuring access to obstetric services. During theCOVID-19 lockdown period, out of the 1140 deliveries, 590(51.8%) were delivered by cesarean sections and 550(48.2%) delivered vaginally. Similarly, rate of vaginal delivery was 814(50.7%) and 790(49.3%) delivered by cesarean section during non COVID-19 period with no statistical difference, (Table 2).

Postpartum hemorrhage occurred in 17 (2%) and 14 (2%) during both the period which is very low when compared to overall data (Table 3). This could be due to short duration of study of only 84 d, which was the COVID-19 lockdown period. Also, pregnancy associated medical disorders like severe preeclampsia/eclampsia occurred in only around one percentage of deliveries, which is very low when compared to overall data. This also could be due to less sample size of our study. Other maternal complications like sepsis, cesarean hysterectomy were also comparatively low compared to general data during the periods. Overall near-miss cases were observed in 35(3%) and 29(3%) of deliveries during both COVID-19 and non COVID -19 period. Fortunately, there were no maternal deaths during COVID-19 lockdown period and also during non COVID-19 period, same time a year back, (Table 3).

The rate of stillbirth was similar in both the periods accounting for 17 (1.5%) and 26(1.6%) during COVID-19 lockdown period and non COVID-19 period respectively. Similarly, the rate of early neonatal death was also similar during both the periods, accounting for 4 (less than 1%) and 10 (less than 1%), (Table 2).

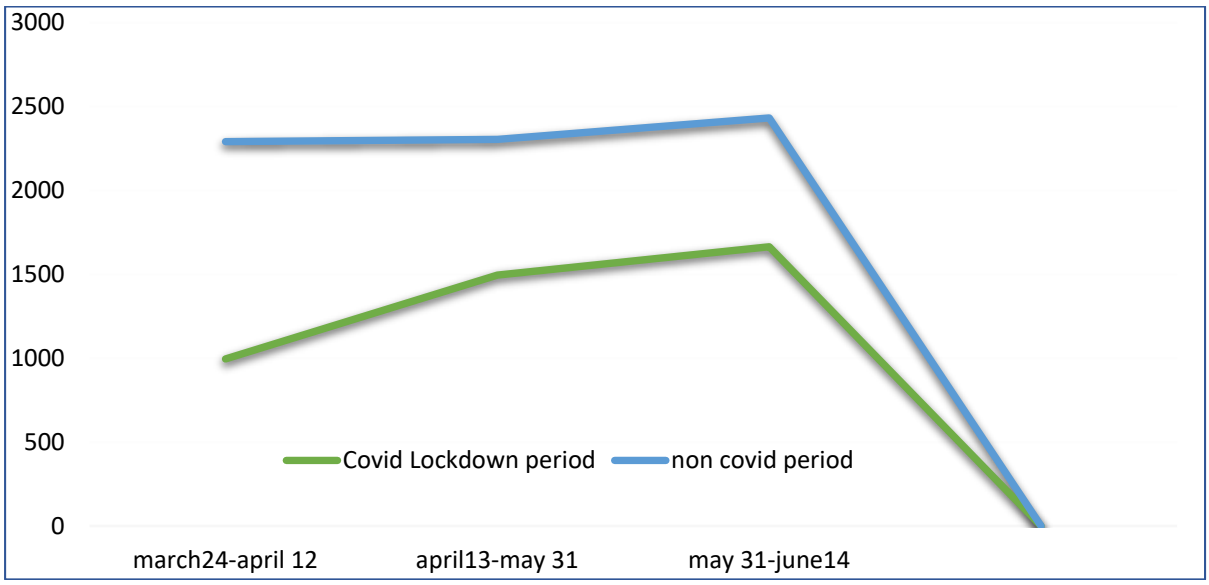

Figure 1. Antenatal visits during COVID-19 lockdown period (2020 AD) and non COVID-19 period (2019 AD)

Table 1. Maternal and neonatal characteristics during COVID-19 lockdown period

Maternal Characteristics	Frequency (N=1140)	Percentage %
Age		
<20 y	56	4.9
20-35 y	1016	89.1
>35 Y	68	5.9
GA at delivery		
<37 weeks	100	8.7
≥37 weeks	1040	91.22
Antenatal Check up		
Yes	1091	95.8
No	49	4.2
Mode of Delivery		
Vaginal	550	48.2
LSCS	590	51.8
Neonatal Characteristics		
Sex		
Male	506	44.4
Female	634	56.6
Birth weight		
<2.5 Kg	175	15.3
2.5-3.5 Kg	816	71.5
>3.5 Kg	149	13.07

Table 2. Comparison between Maternal and Neonatal Outcome during non COVID-19 and COVID-19 lockdown period

Characteristics		Non-COVID period N(%)	COVID-19 lockdown period N(%)	p-value
ANC checkup				
Yes	Patan Hospital	1101(68.6)	750(67.0)	0.059
	Outside	479(29.9)	341(30.5)	
No ANC		24(1.5)	49(4.2)	
GA at delivery				
Pre-term (<37 weeks)		209 (13.02)	100 (8.7)	<0.001*
Term (≥37 weeks)		1395 (86.97)	1020 (91.22)	
Mode of delivery				
Vaginal		814 (50.7)	550 (48.2)	0.257
LSCS		790 (49.3)	590 (51.8)	
Birth outcome				
Live birth		1568 (97.8)	1119 (98.1)	0.870
Still birth		26 (1.6)	17 (1.5)	
Early Neonatal death		10 (0.6)	4 (0.3)	
Total		1604	1140	

*Chi-square test; p<0.05 indicates statistically significant

Table 3. Comparison of Maternal outcome during non COVID-19 and COVID-19 lock down period

Maternal Complications	Non COVID-19 Period N(%)	COVID-19 lock down Period N(%)
PPH	17 (1.05)	14 (1.22)
Eclampsia	5 (0.3)	5 (0.4)
Severe preclampsia requiring ICU care	9 (0.5)	7 (0.6)
Sepsis	2 (0.12)	1 (0.08)
Cesarean hysterectomy	2 (0.12)	2 (0.18)
Near misses	35 (2.1)	29(2.5)
Total	35	29

Table 4 Comparison of Neonatal Outcome during non COVID-19 and COVID-19 lock down period

Perinatal Complications	Non COVID-19 period N(%)	COVID-19 lock down period N(%)
NICU admission	50 (3.1)	54 (4.7)
Nursery admission	235 (14)	253 (22)
Transient tachypnea of newborn (TTN)	67 (4.1)	54 (4.7)
Early neonatal sepsis (EONS)	88 (5.4)	114 (10)

Fifty-four (4.7%) and 50(3.1%) of the newborns required neonatal intensive care unit admission (NICU) during COVID-19 and non COVID-19 period respectively. There was a similar rate of neonates who had transient tachypnoea of newborn (TTN), 54(4.7%) and 67(4.1%) during COVID-19 and non COVID-19 period respectively. Higher number of neonates required nursery admission during COVID-19 lockdown period when compared to non COVID-19 period, 53(22%) and 235(14%) respectively. Similarly, more number of early onset neonatal sepsis cases was observed during COVID-19 lockdown period, 114 (10%) whereas 88(5.4%) had early neonatal sepsis during non COVID -19 period, (Table 4).

Discussion

The overall reduction rate of antenatal visits during COVID-19 lockdown was 40 percent in our study which is comparable to a study conducted in Jordan in 2020 with reduction rate of upto 59.5%.[8] Patan Hospital was designated as one of the COVID-19 hub hospital in the country. This might be the reason for reduction in the rate of OPD visits during COVID-19 lockdown period as patients were afraid to visit COVID-19 designated hospital for the fear of exposure to SARS-COV-2 to themselves.

Our study reports decrease in institutional delivery rate by 28 percent when compared to non COVID-19 period. Reduction in institutional delivery was also reported in multiple studies conducted in a SUSTAIN and REFINE studies in nine referral hospitals of Nepal in 2020.[9] Our study also showed significant disparity in the reduction of antenatal visits (40%) and delivery rate (28%) which might be because of many women's view of ANC visits being unnecessary whereas birth being unavoidable. It can also be assumed that most of the women might have opted for delivery in other institutions/hospitals which were not COVID-19 dedicated hospitals or in less crowded private hospitals and thus perceived to be much safer.

In our study, most of the women belonged to the age group 20-35 y which is similar to a study conducted in Jordan in 2020 where 90% women belonged to this age group.[8] Most of the patients who delivered at our hospital had ANC care though the total number of ANC patients was reduced drastically during COVID -19 lockdown at our center. This study shows no difference in mode of delivery (almost equal rate of vaginal and cesarean delivery) during both the periods which matches the study conducted in New York City Health and Hospitals in 2020 where delivery by cesarean section was 44.4% and via vaginal was 55.6%.[10]

Fortunately, It was also observed that there was no difference in maternal complications when compared between COVID-19 lockdown and non COVID-19 period as also seen in a study conducted at Manipal Teaching Hospital, Nepal in 2020.This study reported 17.38% of maternal complications during COVID -19 period and a similar 18.43% during non COVID -19 period.[11] Most of the maternal complications were static in this study like postpartum hemorrhage, severe preclampsia, eclampsia, sepsis, patients requiring intensive care stay and cesarean hysterectomy though the overall data is relatively low when compared to general statistics. This could be due to the short duration of study which was only 84 d during the 1st phase COVID-19 lockdown.

Although, there was a sharp increase in national maternal mortality rate up to 200% in Nepal during the 2 m COVID-19 lock down period between March and May, 2020,[12] fortunately, there was no maternal mortality at our hospital during the COVID-19 lock down period. The reported increase in the maternal mortality during this period could have been due to increased number of unattended home deliveries or complicated pregnancy deliveries at lower level health facility owing to restrictions in transport due to the stringent lockdowns. This could have eventually led to significantly reduced access to timely medical intervention leading to this unfortunate rise.

Our study reveals a significant reduction in rate of preterm delivery (8.7% in COVID-19 lockdown period compared to 13.02% in non COVID 19 period) similar to a study conducted in Italy which also showed a reduced relative risk ratio of preterm births by 0.91 with confidence interval CI (0.88-0.93).[13] This study was similar to a study conducted in Canada in 2020 with a preterm births of 84/1000 live births and 92.7/1000 live births (p=0.007) in COVID-19 and non COVID-19 period respectively.[14] Similarly, another study conducted in Tennessee in 2020 also revealed reduction in preterm births 10.2% and 11.3% in COVID-19 and non COVID-19 period with p value of 0.003.[15] Another study conducted in Philadelphia also showed similar findings of reduced preterm births of 9.9% and 12.6% in COVID-19 and non COVID-19 period respectively.[16] Contrary to our findings of reduced preterm births during the lockdown period, an observational prospective study in Nepal published in Lancet in 2020 showed significantly higher rate of preterm deliveries with relative risk ratio of preterm delivery by 1.3.[17] Preterm birth is a major contributor to perinatal mortality and morbidity and an estimated 15 million babies are born too early every year.[18] The study by Khalil A, et al. showed no changes in preterm birth rate when compared to non COVID-19 period.[19] The reduction in the number of antenatal visits during COVID-19 lockdown might have led to a decrease in the identification of pregnancies requiring medically indicated preterm births, resulting in a decreased proportion of iatrogenic preterm births.

The rate of stillbirths and early neonatal death remained the same through COVID-19 lockdown period and non COVID-19 period (1.5% and 1.6% respectively) which is comparable to a study done in Manipal Teaching Hospital, Nepal in 2020 with a stillbirth rate of 1.96% and neonatal death of 0.93%.[11] However, the rate of nursery admission during COVID-19 lockdown period was higher contrary to a study conducted in China which showed less number of admissions.[20] Similarly, the number of early neonatal sepsis cases were higher when compared to non COVID-19 period (10% and 5.4% during COVID-19 lockdown and non COVID-19 period respectively) as also seen in this study conducted in Northeast India in 2020 which showed an odds ratio(95% confidence interval)=1.61(1.02-2.56). [21]

Since this was a single centre study done for a short period of time, the results of this study cannot be generalized. Even though we had an overall decreased rate of preterm deliveries, we were unable to stratify between iatrogenic and spontaneous preterm birth. This is crucial to understand the underlying mechanisms leading to preterm birth.

Conclusion

There was significant reduction in antenatal hospital visits by pregnant women as well as reduction in delivery rate during COVID-19 lockdown period. However, its impact in terms of maternal and perinatal outcome was limited. Preterm births were significantly less during this period.

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Conflict of Interest

None

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