Impact of COVID pandemic on the mode of delivery, outcome, neonatal death and admission to neonatal care unit.

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Abstract
Background: Incidence of cesarean section and normal deliveries is different in each country, the route of delivery whether normal or cesarean may performed for obstetrical indication or some time due to maternal request and may carry several complication for the baby and mother. Wither normal or cesarean delivery many of them need admission to neonatal intensive care unit (NICU) according to gestational age and birth weight. Aim of the study: Is to monitor the trend cesarean section during COVID era and its baby related complications. Method: this is retrospective study that had been conducted in al Zahraa teaching hospital in a period between January 2018 to December 2021. During which; all the hospitals data have been checked to measure the percentage of CS in comparison to VD during COVID pandemic era and comparing the results with pre COVID pandemic period. Also the fetal outcomes had been studied to show the possible complications. Result

1. Introduction

According to WHO, about 15%of deliveries were strongly indicated for C/S for preserving maternal and/or fetal health(1). However the rate of normal delivery decreasing rapidly against the increasing rate of C/S over all the whole world especially in the last two decades(2).
According to the last data from 150 countries, 18.6% of births happened by CS it range between 6% in developing countries and 27.2% in the developed countries. Based on trend analysis the CS birth rate from 121 countries had be increasing gradually from 6.7% to 19.4% between 1990 and 2014 represented 12.4% increase with annual 4.4% increase(3).
In the Middle East, there are few data about this increasing rate of CS and in United Arab Emirates and Saudia for example there is high rate of CS reach to 33% and 27% respectively (4)(5)
The increasing rate of CS with a parallel increment of the short term, long term maternal, neonatal and childhood complications as well as costs. Attempts to decrease this procedure have been failed because of the short term benefit, the perceived safety of operation, the legal climate and maternal request in the absence of indication(6).
Many complications associated with CS firstly to the mother like postpartum hemorrhage, surgical injury, wound infection and maternal death. The newborn on the other hand is more liable for respiratory distress, birth injury and transient tachypnea of newborn. RDS occur mainly due to loss of stress effect on lung maturity(7).
Some times obstetrion perform CS preterm babies to avoid complication in the labor room in the first 24 hour of birth but this not change or improve the mortality and morbidity rate after that(8).
In the end of 2019 a new virus outburst all over the world caused by Coronavirus cause severe contagious disease may end with severe acute respiratory syndrome, the first case was diagnosed in Wuhan in China(9). After COVID 19 outbreak almost all life aspects had been affected mainly what concerned the health and education. Regarding the rate of pregnancy affected all over the world may be due to emotional cause because of fear from the disease or spread of dangerous new disease beside limitation of movement in both heath care and general population(9).
The restrictive measures that happened in many countries led to unavoidable restriction in gross domestic product with loss of jobs and employee rent this made couples uncertain or fear from having babies(10). Lastly, health care overload and loss of medical contact especially non urgent medical services affect and minimize their efforts. Similarly fertility centers reduce their activates and postponed most medically assisted procreation procedures(11).
All these factors reduce the rate of pregnancy in general and delivery whether normal or cesarean.

2. Material and Method

Study design area and setting .

This is a cross section study. The study conducted to the department of neonatology al Al Zahraa

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teaching hospital, Najaf, Iraq. The data have been acquired from the hospital medical digital records department

Identification of study participants:

Inclusion Criteria:

All pregnant women who delivered and received medical care at Al Zahraa teaching hospital, Al Najaf, during four years from January 2018 to December 2021 will be included in the study as a consecutive sampling to include all the population in the desired period. Also we included all neonates who admitted to the NICU in the same period.

Exclusion Criteria :

Gestational age less than 24 weeks.
Infant weight less than 700 g during delivery.
Neonates with congenital anomaly.
Neonates transported to PICU.

Data collection process:

The data of all deliveries that occurred in Al Zahraa teaching hospital in Al Najaf between 1st of January, 2018 to 31st of December 2021 was attained from the hospital digital records registry. A data collection sheet form was designed, revised totally and eventually used to collect the obstetrical and neonatal information on both maternal and neonatal characteristics were gestational age and type of delivery whether normal or CS. As for the neonatal characteristics, data were gestational age, weight at birth, and the number of death each characteristic involved the total number and the number that admitted to neonatal intensive care unit.

Statistical analysis:

Data were collected and analyzed by SSPS version 2F from IBM, software package. Continuous data were expressed as mean, median, range, and standard deviation (SD). For the continuous variables, a test tests were employed to analyze the difference. For the categorical variables, a chi-squared test (x2 test) was conducted. ANOVA test was used for multiple correlations for the degree of association between the parametric variables. A two-tailed P value of <.05 was considered statistically significant.

3. Results

This is a cross-sectional study performed on the total number of deliveries in Al Zahraa hospital and neonatal admission and death in 4 years including two years before and two years after COVID

Table 1 demographic analysis of total birth and death

Year	NVD MALE	NVD FEMAL	NVD TOTA	CS MALE	CS FEMALE	CS TOTAL	Total birth	dead birth
2018	7150	6770	13920	4270	3720	7990	21910	324
2019	6562	6402	12964	4237	3905	8142	21106	246
2020	6390	6378	12768	3478	3118	6728	19496	241
2021	6020	5761	11781	3612	3309	6967	18748	239

Table 2 demographic analysis of number of neonatal admission to NICU survival and death

admission NICU	NICU/NVD	NVD/DEATH	NICU/CS	CS/DEATH
1413	479	187	638	153
1400	547	194	784	184
1359	564	196	740	148
1312	535	174	738	145
5484	2125	751	2900	630

Table 3 comparisons between variable mode of deliveries , admission and neonatal death either still birth or neonatal death

	Before COVID Mean±SD 2018/2019	After COVID Mean±SD 2020/2021	p- value
NVD MALE	**6856±415.77**	**6205±261.62**	**0.224**
NVD FEMAL	6586±260.21	6069.5±436.28	0.312434
NVD TOTAL	13442±675.99	12274.5±697.91	0.2314
CS MALE	4253.5±23.33	3545±94.75	0.0479*
CS Female	3812.5±130.81	3213.5±135.05	0.045*
CS Total	8066±107.48	6847.5±168.99	0.021*
Total birth	21508±568.51	9122±528.91	0.049*
Dead birth	285±55.15	240±1.41	0.454
admission NICU	1406.5±9.19	1335.5±33.23	0.183
NICU/NVD	513±48.08	549.5±20.5	0.467
NVD/DEATH	190.5±4.94	185±15.55	0.705
NICU/CS	711±103.23	739±1.41	0.766
CS/DEATH	168.5±21.92	146.5±2.12	0.389

In table 3 there is no statically significant in normal deliveries neither for male nor for female outcomes. While there is statically significant in the C/S whether male or female outcomes an in the total birth. Regarding the number of admission to NICU whether normal delivery or C/S and death all were not significant statically . as showed in diagrams

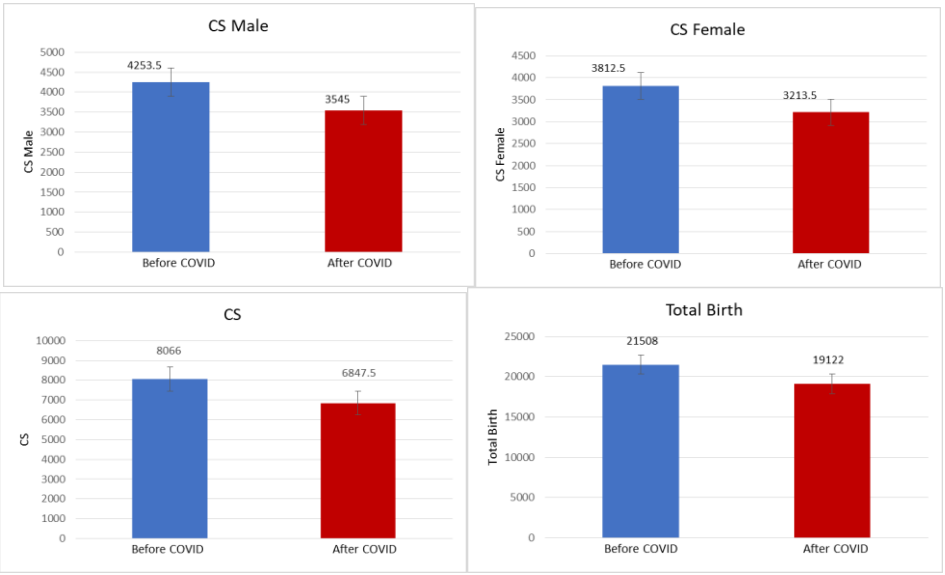

Table 3 Odd ratio and 95% CI between NVD and CS for male and females outcome												
Mean	NVD male	CS male	Odd ratio	95 % CI	NVD female	CS female	Odd ratio	95 % CI	Total NVD	Total CS	Odd ratio	95 % CI
Before covid	6856	4253.5	0.92	0.97-0.87	6586	3812.5	0.91	0.96-0.86	13442	8066	0.92	0.96-0.89
After covid	6205	3545			6069.5	3213.5			12274.5	6847.5		

We found significant odd ratio regarding the rate of both males and females CS deliveries . in other words. Logistic/linear regression analyses adjusted for total birth whether NVD or CS after COVID [values are OR (95% CI)].

Table 4 Odd ratio and 95% CI between total birth and still birth and admission to neonatal care unit							
mean	Total birth	Still birth	Odd ratio	95 % CI	Admission to NICU	Odd ratio	95 % CI
Before COVID	21508	285	0.94	1.12-0.79	1406.5	1.06	1.15-0.98
After COVID	19122	240			1335.5		

Still birth and early neonatal death increase during COVID OR 0.94% CI(1.12-0.79) also the number of admission to NICU were more after COVID OR 1.06% CI(1.15-0.98)

4. Discussion

In the last three years ago all countries on the earth suffer from the evolution of new devastating disease which is COVID 19 new, unknown and infectious disease spread almost all the world affecting all aspects of life including planning of pregnancy and many health aspect. In this study we found increase the rate of CS over the NVD which is met the rapid increase the trend of CS all over the world in general regardless the pandemic of COVID or any other disease as our country had high rate of CS this met with Ana Pilar Betran, Jiangfeng Ye et al(12). Some times CS done for non medical indications such as the patient wishes especially in private clinics or hospital(13). During COVID pandemic almost every aspect of life change including mainly health issues, in our study we show decreasing the rate of delivery for both normal vaginal and cesarean section for both sex males and females and many study agreed with us(14)

Given the recency and evolving situation in the COVID-19 pandemic, there are some objective calculations of how it may influence birth rates globally or in the US. In June 2020, the Guttmacher Institute published survey data on how the COVID-19 pandemic is affecting women sexual and reproductive health, which found that more than 40% of women reported to change their plans about when to have children and how many children to have, with 34% wanting fewer children or to delay having children.(15)

This decline may be due to real decease in birth rates or may be due to decrease total hospital visits due to fear from hospital during pandemic or difficult arrivals during lockdown and lastly many people show interest in home birth in stead of hospital because of increasing fear form hospital and they preferred the private hospitals rather than public hospital for the same reason(16). Regarding the early neonatal death we noted increase the number of death Berna Hekimoğlu(17) agreed with us we think that during the COVID-19 pandemic, it was shown that pregnant women disrupted their regular antenatal care, and a lot of pregnant women were admitted to the obstetric emergency department with emergencies CS or complicated deliveries requiring acute intervention and many of them were small for gestational age or had hypoxic ischemic encephalopathy ended with death. Almost for the same reason the number of neonatal admission to neonatal care unit become more(18) in which preterm delivery affected a higher proportion

of women than expected based on historical and contemporaneous national data. The proportions of pregnancies affected by stillbirth, a SGA infant or birth asphyxia were more so the admission increased .

5. Conclusion

The wide spread of caesarian section all over the world carries a lot of complications and difficulties in all times whether in normal circumstances or in the pandemics like in COVID era. During COVID 19 outbreak which change the whole world in almost all life aspect and especially health issues for both mothers and their babies.

6. Recommendation

1. Normal vaginal delivery almost carries better outcome for both mother and children.
2. Family planning and regarding the health issues should be consider in all time.
3. Any disease or out break affect negatively on the outcome so prophylactic and immunization may minimize the mortality and morbidities.

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