Volume 3, 2021, 886658

GUHES

Journal of Gazi University Health Sciences Institute

journal homepage: https://dergipark.org.tr/tr/pub/guhes

Examination of Births Before COVID-19 Pandemic Normalization Process and Comparison with Previous Years; A Retrospective Cohort Study

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Article info:

Received:26.02.2021

Accepted:06.09.2021

Keywords:

Cesarean section,
Birth,
Pandemic,

Abstract

In this study, we wanted to show the occurrence of the COVID-19 pandemic by cesarean section. The weekly average number of live births, in March-April and May of 2017-2020, three doctor working in the public sector, and the other three doctor working in the public sector, a total of six gynecological births are retrospectfol players. Cesarean section between 2017-2020 are more than normal spontaneous vaginal delivery. Cesarean delivery in a non-public hospital rate is higher than public hospital. Dramatic variation in cesarean rates even among at non-public physicians available. Caesarean section during the first trimester of the COVID-19 pandemic prevalence has increased. Changes in birth patterns in extraordinary situations should be examined in detail.

1. Introduction

Cesarean section (C/S), one of the oldest surgical operations in the history of medicine. First record of birth in history It belongs to the Sumerians in 2000. First successful C/S was made in Switzerland in 1500 (Turamanlar and Songur, 2014). In ancient times, this procedure was done when only pregnant women were about to die or they died and seen as a last solution to save the fetus. Also, usually the mother and babies could not be saved. The first modern cesarean section was performed by the German gynecologist Ferdinand in 1881 whose name was Dr. Adolf Kehrer (Todman, 2007). Next factors such as the development of technology and the use of

antibiotics confidence in cesarean deliveries increased with the effect of over the years (Gozukara & Eroglu, 2008), 30% of the cesarean section rates have been increased on (Karabel, Demirbas & Inci, 2017).

World Health Organization (WHO) in 1985, a team of reproductive health professionals organized by on the panel; emphasized that C/S deliveries shouldn't be above of 10-15% (WHO, 2015). When medically necessary, C/S is associated with perinatal mortality and effectively prevent morbidity (Hannah et al., 2000). However, WHO reported that cesarean rates above 15% found to be unrelated to maternal and infant mortality (WHO, 2015). Increasing rates of off-label C/S may cause many risks to the both mother and baby. In addition, from an economic point of view, it is a burden on health systems which working with limitted budget (Belizán, Althabe et al. 1999). From any angle, hight cesarean rates which are more than necessary is a serious health issue for many countries. In addition, C/S is a surgical procedure and made must under medical issues and it should be noted that there is no alternative of normal spontaneous vaginal delivery (T.C. Ministry of Health, 2008).

The risk of mortality and morbidity in C/S is four times higher than vaginal delivery and there is many disadvantages of the mother's milk does not come, long-term pain, etc. (Konakci & Kilic B, 2002). However, the increase in the socioeconomic level, healthcare workers worry about malpractice, misconception of society about cesarean section is caused in recent years even if there is no risk for mother or baby cesarean section is preferring instead of normal spontaneous vaginal delivery (Filiz, 2020).

In 2007 C/S rates were 39% in Italy, in Portugal 35%, in the United States and Switzerland 32% (Declercq, Young et al., 2011). According to the South African Demographic and Health Survey in 2016 year 87.4% of births at Africa take place in public hospitals and the C/S rate is 21.7. However, only 8.5% of births are non-public hospitals with a C/S rate of 61.3% (South Africa National Department of Health, 2019). To India's 2015–16 National Family Health Survey the C/S rate is 4.4% for the poorest women, compared for the richest women is 35.9%. In addition, the C/S rate, which was 16.0% in 1998, increased to 24.0% in 2016 (Government of India Ministry of Health and Family Welfare, 2015). There is a similar stuation in our country. At Hacettepe University in 1976, 1986, 1996, 2006 and 2016 when the births were examined, the C/S rate was found out that in order of 11.4%, 19.2%, 44.7%, 69.3% and 77.9% (Cagan, 2017). The C/S rate in Turkey is According to Turkey Demographic and Health Survey (TNSA)-1998, 2003, 2008, Compared to 2013 and 2018 there is an extremely dramatic ascending rate this founds are results; 14.0%, 21.0%, 37.0%, 48.0% and was 52.0% (Hacettepe University Institute of Population Studies, 1998; 2003; 2008; 2013; 2018).

The medical point of view is not sufficient to deal with this condition. Health policies in countries and the perception of society are very important in this situation (Uzun & Dag, 2019). For example, due to the increasing C/S trend in Qom Province of Iran, "Natural Birth Support Program" was implemented in 2014, while the C/S rates in public hospitals were decreased in 2005-2018. It was increased in hospitals other than state hospitals (Khazaei, Khodakarim et al., 2019).

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In Turkey, both Health and Health Services aimed to reduce the cesarean section rates in last years. The work of the Ministry, many institutions and associations are available from past to our time. For example, in 2011 with the Turkish Gynecology and Obstetrics Association Ministry of Health, high cesarean section rates in Turkey prepared a joint action plan to reduce the cesarean rate was aimed to decrease to 35.0% (Isguder et al., 2017). However, the expected overall effect did not occur. The biggest reasons for this also; maternal demands (fear of childbirth), non-public hospitals policy, payment of C/S insurance, education of maternal age and as the fear of childbirth was detected (Filiz, 2020).

As of 2019, the COVID-19 pandemic has changed the habits of the whole world and it is wondered how it is reflected in birth patterns. Pregnant women mıust benefit from health services as much as before they did. If they did not reach to this, in which issues there were problems, detection is very important. Birth is critical for both mother and baby. Therefore, it is necessary to determine how it is affected by the pandemic process. No evidence of how extraordinary circumstances will affect how birth rates will be affected Birth rates in extraordinary circumstances. There are not enough data and studies about its evolution. Covid started in December 2019 and arrived in our country in March. In March-April and May due to the COVID-19 pandemic many health services have changed shape. Meetings that required people to come together were postponed, some outpatient services slowed down, scans interrupted. These conditions are thought to affect the birth processes. In June 2020, the process called normalization started and health services gradually regained started to catch up their old rhythm. The aim of our study was that the average birth rate was 30 (crude birth rate ‰1) in a province before the COVID-19 pandemic normalization process (year 2020 birth rates before June) birth rates (normal spontaneous vaginal delivery and as cesarean section rates) retrospectively. It is the examination of the effect of the pandemic on the process.

2. Materials and Methods

The COVID-19 pandemic reached our country in March and some decisions have been for all country. In June 2020, the normalization process started. March-April-May months are very important that the disease has not started and the pandemic process wasn’t completed yet. Those months conditions is so good for understand to reflex of our country to extraordinary situations in this process, becouse of the different dynamics we decided to evaluate public and non-public hospitals, 2017-2020 in a province with 30 live births per week. Three physicians working in a public institution in March-April and May three physicians working in a non-public institution, total of 1721 births performed by six doctors were analyzed retrospectively. Obstetrician and gynecologist working in a public hospital physicians are coded as A, B, and C. Obstetrics and gynecology working in a non-public hospital specialist physicians are also coded as D, E and F. Statistical analyzes were made with SPSS v15 program. The permission of the Ministry of Health has been obtained, the data are related Retrieved from the department. Ethics committee decision from Cankiri Karatekin University (05.11.2020, decision no: 14012021103416) was taken.

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3. Findings

Six obstetricians and gynecologists participated in this study. Five of the physicians were male (83.3%) and one was female (16.7%). Age average of 47.3±3.5, as gynecology and obstetrician the average of years in the profession is 15.7±3.7. Six physicians in March-April and May 2017-2020

She had a total of 1721 live births. All pregnancies are singular and age distribution of pregnant women. It is shown in Table 1.

According the data 31.7% of pregnant women in 2017, 37.6% in 2018, 30.8% in 2019 and 32.3% in 2020 appears to be in 25-29 the age range. It is also noteworthy that pregnancy under 18 years of age rate in 2018, 2019 and 2020. In 2020 it is dramaticly decreased compared to the previous years. Three gynecological diseases and obstetricians in March-April and May 2017-2020 according to the birth type of the births they had in the months of distribution is shown in Table 2.

C/S in deliveries performed by physician A (public employee) rate 44.1% in 2017, 56.7% in 2018, in 2019. While it was 19.0%, in 2020, when the COVID-19 pandemic was experienced, this rate is 45.4%.C/S in deliveries performed by physician B (public employee) rate 48.1% in 2017, 54.9% in 2018, and in 2019 while it was 40.0% in 2020, when the COVID-19 pandemic was experienced, this rate is 59.5%. C/S in deliveries performed by a C physician (public employee) rate of 55.5% in 2017, 56.0% in 2018, in 2019 while it was 65.2%, in 2020, when the COVID-19 pandemic was experienced, this rate is 73.1%.

Table 1: Age distribution of pregnant women in Cankiri in 2017-2020 March-April-May (N: 1721)

	2017 March-April-May n (%)			**2018 March-April-May n (%)**			**2019 March-April-May n (%)**			**2020 March-April-May n (%)**		
Ages	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***
<18	25	11	36	26	6	32	11	12	23	28	6	34
	(20.4)	(4.8)	(10.3)	(14.8)	(2.1)	(7.0)	(6.8)	(4.1)	(5.1)	(25.0)	(1.6)	(7.3)
18-24	32	60	93	31	74	105	44	71	115	29	104	133
	(26.2)	(26.3)	(26.5)	(17.7)	(26.8)	(23.2)	(27.3)	(24.4)	(25.4)	(25.8)	(29.2)	(28.4)
25-29	38	73	111	74	96	170	43	96	139	30	121	151
	(31.1)	(32.0)	(31.7)	(42.2)	(34.7)	(37.6)	(26.7)	(33.0)	(30.8)	(26.8)	(34.0)	(32.3)
30-34	19	49	68	30	69	99	40	68	108	16	80	96
	(15.6)	(21.5)	(19.4)	(17.1)	(25.0)	(22.0)	(8.8)	(23.3)	(23.9)	(14.3)	(22.5)	(20.5)
35-39	7	25	32	13	29	42	18	32	50	6	41	47
	(5.7)	(11.0)	(9.1)	(7.4)	(10.5)	(9.3)	(4.0)	(11.0)	(11.0)	(5.3)	(11.5)	(10.0)
40-44	1	10	11	1	2	3	5	12	17	3	4	7
	(0.8)	(4.3)	(3.1)	(0.5)	(0.7)	(0.6)	(1.1)	(4.1)	(3.8)	(2.6)	(1.2)	(1.5)
Total**	122	228	350	175	276	451	161	291	452	112	356	468
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

*Row percentage **Column percentage

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Table 2: The rates of normal and cesarean deliveries performed by three obstetricians working in a public hospital in 2017-2020 March-April-May (n: 884)

	2017 March-April-May n (%)			2018 March-April-May n (%)			2019 March-April-May n (%)			2020 March-April-May n (%)		
Code	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***
A	19	15	34	16	21	37	17	4	21	18	15	33
	(55.9)	(44.1)	(100.0)	(43.3)	(56.7)	(100.0)	(81.0)	(19.0)	(100.0)	(54.6)	(45.4)	(100.0)
B	28	26	54	104	78	142	84	56	140	40	59	99
	(51.9)	(48.1)	(100.0)	(45.1)	(54.9)	(100.0)	(60.0)	(40.0)	(100.0)	(40.5)	(59.5)	(100.0)
C	28	35	63	22	28	50	31	58	89	22	60	82
	(44.5)	(55.5)	(100.0)	(44.0)	(56.0)	(100.0)	(34.8)	(65.2)	(100.0)	(26.9)	(73.1)	(100.0)
Total number and percentage** (%)	75	76	151	142	127	269	132	118	250	80	134	214
	(49.6)	(50.4)	(100.0)	(52.7)	(47.3)	(100.0)	(52.8)	(47.2)	(100.0)	(37.3)	(62.7)	(100.0)

* Row percentage **Column percentage

Three gynecologists working in a non-public hospital and obstetrician in March-April and May 2017-2020 according to the birth type of the births they had in the months of distribution is shown in Table 3.

In births performed by physician D (non-public employee) C/S rate 75.9% in 2017, 76.9% in 2018 it was 82.1%, in 2019, when the COVID-19 pandemic was experienced in 2020, this rate is 89.7%. In births performed by an E physician (non-public employee) C/S rate 48.8% in 2017, 68.0% in 2018 while it was 74.2% in 2019 and then when the COVID-19 pandemic was experienced in 2020, this rate is 78.0%. In births performed by F physician (non-public employee) C/S rate 93.1% in 2017, 91.3% in 2018 while it was 92.5% in 2019, when the COVID-19 pandemic was experienced in 2020, this rate is 89.6%.

Figure 1 shows that the 2017 and 2020 deliveries at C/S rate of six gynecologists. C/S rates of physicians working at non-public hospitals is higher than physicians working at public hospitals during 2017-2020 March-May-April ($p<0.05$). However C/S rates' decreasing in 2019 is a reflection of a face to face education project with physicians. However, due to the lack of continuous training and the effect of the pandemic, C/S birth rates were risen again unfortunatly. The peak in C/S in 2020, was compared to the previous years, was significantly higher ($p<0.05$). In particular, C/S rates in the public hospital experienced a peak in March-April-May 2020, at the beginning period of the pandemic.

The distribution of births in public and non-public hospitals in March-April and May between 2017-2020 according to public and non-public hospitals is shown in Table 4 and Figure 2.

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Table 3. Normal and cesarean delivery rates performed by three obstetricians working in a non-public hospital in 2017-2020 March-April-May (n: 837)

	2017 March-April-May n (%)			2018 March-April-May n (%)			2019 March-April-May n (%)			2020 March-April-May n (%)		
Code	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***
D	20 (24.1)	63 (75.9)	83 (100.0)	9 (23.1)	30 (76.9)	39 (100.0)	13 (17.9)	60 (82.1)	73 (100.0)	9 (10.3)	79 (89.7)	88 (100.0)
E	22 (51.2)	21 (48.8)	43 (100.0)	16 (32.0)	34 (68.0)	50 (100.0)	9 (25.8)	26 (74.2)	35 (100.0)	11 (22.0)	39 (78.0)	50 (100.0)
F	5 (6.9)	68 (93.1)	73 (100.0)	8 (8.7)	85 (91.3)	93 (100.0)	7 (7.5)	87 (92.5)	94 (100.0)	12 (10.4)	104 (89.6)	116 (100.0)
Total number and percentage**(%)	47 (23.6)	152 (76.4)	199 (100.0)	33 (18.1)	149 (81.9)	182 (100.0)	29 (14.3)	173 (85.7)	202 (100.0)	32 (12.5)	222 (87.5)	254 (100.0)

* Row percentage ** Column percentage

C/S rates are 65.1% in 2017, 61.1% in 2018, 64.3% in 2019, and we see that this rate was 76.0% in 2020. In non-public hospitals, C/S rate is higher in all years than in public hospitals ($p < 0.05$). In both public and non-public hospitals, C/S rates have increased over the years ($p < 0.05$). There was a peak in 2020. In particular, V birth rates in the public hospital experienced a peak in March-April-May 2020, the beginning period of the pandemic.

4. Discussion

As a result of our study, we determined that the rate of cesarean section increased over the years. According to the data, this increase is concentrated on non-public hospitals. In addition, this significant increase has a great effect on the preference of expectant mothers. Rates of births in a university hospital between 2002 and 2007 by years it was 2002'de 37.7% and in 2007'de 51.0% (Yilmaz, Isaoglu & Kadanali, 2009). There were 10239 births in a university hospital in 2002-2010. In 2000 41.8%, in 2010 54.1% realized as cesarean delivery ($p=0.021$) (Demir, Ocakoglu et al. 2012). In a training and research hospital between 2015–2018, 29.4% of 59359 births in 2015, 30.9% in 2016, 33.2% in 2017 and 31.8% in 2018 were cesarean (Uckan & Uckan, 2020). All these studies support our study.

In our study, the rate of cesarean section was over 15%. The cesarean section rate in non-public hospitals is higher than the cesarean section rate in public hospitals because of expectant mothers are worried about normal spontaneous vaginal delivery and that physicians especially in non-public hospitals prefer cesarean delivery.

Our country is a middle-income country (World Bank Group, 2014) and C/S rates are similar in middle-income countries. In a study, In 119 countries, 3% of low-income countries, 36% of middle-income countries and 31% of high-income countries had cesarean rates above 20% between 1991 and 2003.

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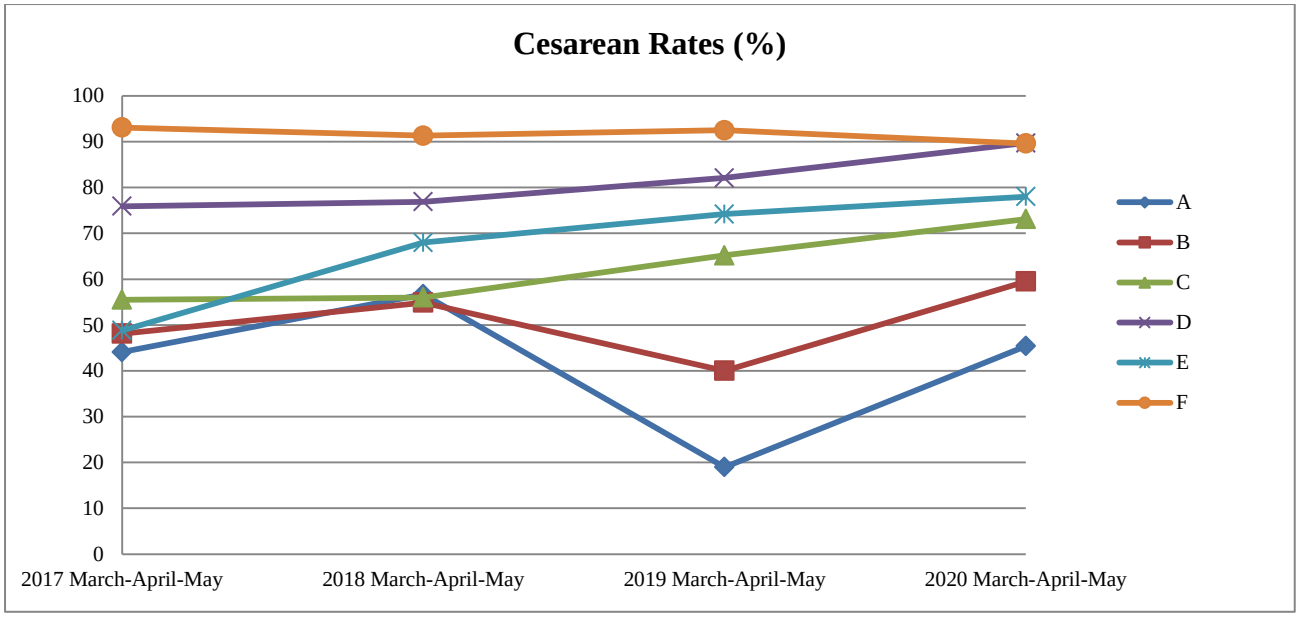

Figure 1. Trend of C/S rates of births performed by six obstetrics and obstetricians between March-April-May of 2017-2020

In low-income countries, a negative and statistically significant linear correlation was observed between cesarean rates and neonatal mortality, and between cesarean rates and maternal mortality. However, no such correlation was seen in middle- and high-income countries (Althabe, Sosa & Gibbons, 2006). This supports the fact that off-label C/S rates are higher in middle-high income countries. In another study, while cesarean rates are below 15% in seven countries out of 19 Latin American countries, the rates vary between 16.8% and 40.0% in 12 countries. A positive and significant correlation was observed between gross product domestic per capita and cesarean section rate (r=0.746). Higher C/S rates were observed in non-public hospitals than in public hospitals (Belizán, Althabe, Barros & Alexander, 1999). In a study in India, it was stated that a woman who gave birth outside of public was four times more likely to have a cesarean delivery. In the same study, it was stated that 21% of cesarean sections were performed in non-public hospitals due to the guidance of physicians and financial reasons (Bhatiaa, Dwivedib, Banerjeeb & Dixit, 2020).

The rate of cesarean section in March-April and May 2020, when full quarantine was applied in our country due to the COVID-19 pandemic, is higher than the same periods of other years. In a study conducted in China during the COVID-19 period, the rate of cesarean section was found to be 37.3% in uninfected women living in urban areas. In the same study, it was determined that women living in areas severely affected by the pandemic were associated with a higher risk of cesarean section (Zhang et al., 2020). Our study was similarly conducted in an urban and pandemic-affected area, and high cesarean rates were found. In a study conducted in North West England, the rate of cesarean section was 28.3%, while it was found to be 29.7% during the pandemic period. This was not a significant increase ($p>0.05$), but there was a significant change in cesarean delivery types.

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Table 4: Birth rates in public and non-public hospitals between March-April and May 2017-2020 (N: 1721)

	2017 March-April-May n (%)			2018 March-April-May n (%)			2019 March-April-May n (%)			2020 March-April-May n (%)		
Code	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***	**NSVD**	**C/S**	**Total***
Public hospital (A+B+C)	75 (49.7)	76 (50.3)	151 (43.1)	142 (52.8)	127 (47.2)	269 (59.7)	132 (52.8)	118 (47.2)	250 (44.2)	80 (37.3)	134 (62.7)	214 (45.7)
Non-public hospital (D+E+F)	47 (23.6)	152 (76.4)	199 (56.9)	33 (18.1)	149 (81.9)	182 (40.3)	29 (14.3)	173 (85.7)	202 (55.8)	32 (12.5)	222 (87.5)	254 (54.3)
Total number and percentage** (%)	122 (34.9)	228 (65.1)	350 (100)	175 (38.9)	276 (61.1)	451 (100)	106 (35.7)	291 (64.3)	452 (100)	167 (24.0)	356 (76.0)	468 (100)

* Row percentage **Column percentage

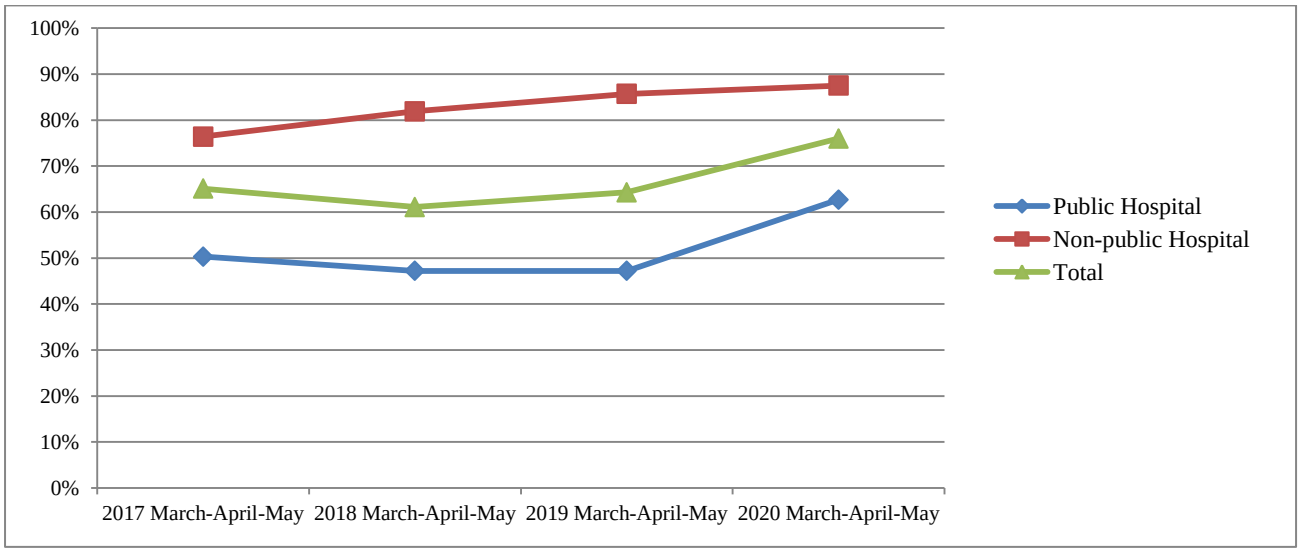

Figure 2. Casarean section rates in March-April-May for 2017-2020 years in a province with an average number of births per week (crude birth rate 1‰)

The rate of cesarean section under general anesthesia decreased from 7.7% to 3.7% ($p<0.05$) (Bhatia et al., 2021). In a study conducted in Wuhan, the cesarean rate was 47% before quarantine, and 48% after quarantine, and no significant change was observed ($p>0.05$). However, the same study found a significant increase from 8% to 11% in cesarean section rates due to maternal demand ($p<0.05$) (Li et al., 2020). The rate of cesarean section in England, which was 29% in 2018 and 30.1% in 2019, increased to 33.9% in 2020 when the pandemic was experienced ($p<0.05$) (Malhotra, Miller et al. 2020)

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5. Conclusion

Due Cesarean section rates have increased significantly over the years. Cesarean section rates performed in non-public hospitals are higher than in public hospitals. Cesarean section rates have increased even more during the pandemic period.

This situation shows us that birth patterns can change in extraordinary situations and situation-specific applications are required. More detailed studies on the subject are needed.

Conflicts of interest

No conflict of interest was declared by the authors.

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