The Rising Trend of Cesarean Sections, Are They Justified?

Fatema A Redha Hasan, OB GYN* Naeema A Kareem Mahmood OB GYN** Latifa Sanad, OB GYN*** Ghadeer Aman, OB GYN**** Shaima Helal, OB GYN*****

ABSTRACT

Background: Cesarean sections (CS) rates have been increasing worldwide, although WHO has announced that the ideal CS rate is 15%. In Bahrain, our rate has risen from 22.4% in 2008 to 32.8% in 2018, which is double the recommended rate. This research aims to identify the cause of this rising trend.

Design and Method: A cross-sectional compares the lowest CS rate, which was in 2008 (22.4%), and the CS rate in 2018 (32.8%), the highest in a decade. We are using the labor ward register book from our biggest hospital in Bahrain (Salmaniya Medical Complex), collecting info on all women who had CS (3,385 women) during the study period were included. The data collected includes age, nationality, gravidity, parity, gestational age, antenatal and postnatal morbidities, urgency, CS indications. Moreover, neonatal data also collected, including sex, weight, and outcome. All data were analyzed using the latest SPSS edition.

Results: CS has increased among non-Bahraini populations from 22.8% to 37.5% and has decreased among Bahraini populations from 77.2% to 62.5%. Among all of the indications of CS, including repeated CS, primary sections, CPD and failure to progress, multiple fetuses, malpresentation, scar rupture, pre-eclampsia, late pregnancy bleeding, and others, there were highly significant differences between 2008 and 2018 in the percentages of mothers with non-reassuring fetal heart rate (NRFHR), which increased from 16.3% to 21.8% (p-value <0.001), and in the percentages of maternal requests, which increased from 10.2% to 15.1% (p-value <0.001), justifying the CS trend. Results showed suspected macrosomia has decreased from 4.7% to 2.1% p-value <0.001 and Fetal Growth Restriction from 1.3% to 0.3% p-value <0.001. Patients who had no antenatal morbidities were the highest in having CS in both years. Elective CS increased from 30.1% to 32.5% in 2008 and 2018, respectively, while emergency CS decreased from 69.9% to 67.5%. Patients who underwent CS and have not had post-partum hemorrhage (PPH) as a complication has increased from 82.6% to 85.6% and NICU admissions from 17.4% to 14.4% in 2008 and 2018, respectively. The number of hysterectomies following PPH in CS was 4 in 2008 and 5 in 2018.

Conclusion: The study suggests the increased rate of CS is justified by the significant increase of NRFHR and maternal request. It occurs more in non-Bahraini populations than in Bahrainis.

INTRODUCTION

Cesarean section (CS) is an obstetric procedure that indicates to save the mother or fetuses lives. Although the World Health Organisation (WHO) announced in 2015, the ideal rate of CS should not exceed 15%[1], globally, the rates have doubled within the last 15 years[2,3].

In the Kingdom of Bahrain, our rate had also increased from 22.4% in 2008 to 32.8% in 2018, based on the Salmaniya medical complex (SMC), which considers our main tertiary care[4,5].

The trend showed different and wide variations in the rates; it has reported the highest rate of CS in the world is in Brazil 51%, where the lowest is in South Africa, which is less than 5%[3,6,7].

Some researchers justified those variations are due to the changes in the characterizes of the population, such as obesity, nulliparous proportion, elderly aged, multiple pregnancies, social and economic factors, and suspected of it's a safer delivery method[2,8,9].

Others justified it based on the changing rates of the indications, such as increasing the demand for CS, fetal distress, multiple pregnancies, repeated CS[10-15].

In 2018, WHO called for reduction, explaining that only 10-15% of CS births were indicated, although it's a lifesaving procedure, it has not reduced the mortality rates[1,2]. Some showed maternal death is higher in CS rather than in vaginal deliveries[16,17].

As a surgical procedure, the higher the incidence of CS, the higher the expected complications such as adhesions, organ injuries, bleeding, blood transfusion, wound infection, thrombosis, uterine rupture, placenta previa, accrete and hysterectomies[18-21,55].

Financially and globally, it showed the "non indicated" CS cost around U$S 2.32 billion, while the cost of the "indicated" ones were around U$S 432 million[22].

* Resident
Arab Board Certified, Governmental Hospitals, Bahrain.
Email:fzumra@hotmail.com
** Assistant Professor
*** Resident
**** Family Physician Master Program
***** General Physician

The research aims to identify the causes of our rising trend of CS to reduce our future morbidities and mortalities rates.

OBJECTIVES

- We aim to study the indications of CS over two periods of time separated by ten years, 2008 and 2018.
- In Bahrain, the lowest rate of CS in a decade was in 2008, which was 22.4%, and the highest was in 2018, which was 32.8%.
- To compare the indications of those two periods, aiming to justify the rising of CS rates in Bahrain.
- To recognize the outcome in the mother and baby.

IMPLICATION

The goal of the study is to explore the indications of CS as a contributing factor for rising CS rates aiming by identifying these factors to minimize our rates and avoid further morbidities.

MATERIAL AND METHODS

Setting: At Salmaniya Medical Complex (SMC), the tertiary hospital in the kingdom of Bahrain.
Study Design: A cross-sectional retrospective study.
Sample Size : All women who had CS which are (3,385) women. We chose the years 2008 compared to 2018 as CS rate, and these two years are representing of all years.
Data Collection : Data were collected from the SMC labor room register book.
The data collected includes age, nationality, gravidity, parity, gestational age, antenatal and postnatal morbidities, urgency, CS indications. Moreover, neonatal data also collected, including sex, weight, and outcome. Descriptive statistics used in SPSS version 23. Used Chi Square for analyzing the indications.

RESULTS

Rates in Bahrain: CS rates have increased from the last decade from 28.4% in 2008 to 32.8% in 2018, which double the recommended rate of 15%, according to WHO (Figure 1).

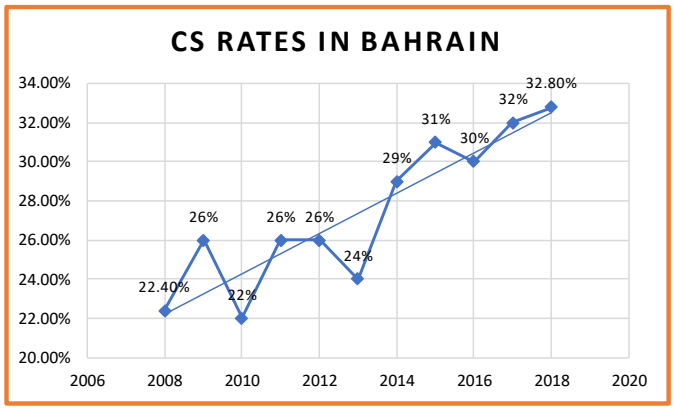


Figure 1: CS rising rates from 2008 to 2018

The study included 3385 women. In 2008 the total women who had CS were 1423 women and in 2018, 1962 women.
Nationality: In comparing between the years 2008 and 2018, we have classified the women who had CS into Bahraini and non-Bahraini women (Table 1).

Table 1: Distribution of nationality in the years 2008 and 2018

Nationality	2008	2018
	n (%)	n (%)
Bahraini	1098 (77.2)	1226 (62.5)
Non-Bahraini	325 (22.8)	736 (37.5)
Total	1423 (100)	1962 (100)

The Total Bahraini women who had CS in 2008 were 77.2% and decreased to 62.5% in 2018. In non- Bahraini women are the opposite as in 2008, the rate was 22.8% and increased to 37.5% in 2018 (Figure 2 and 3).

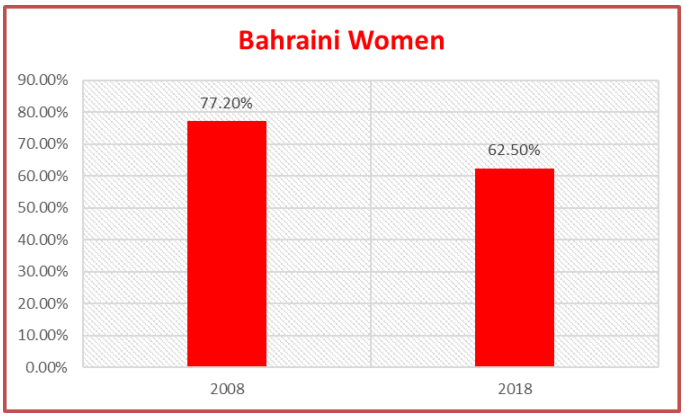


Figure 2: CS rate decreased in Bahraini women from 77.2% to 62.5%

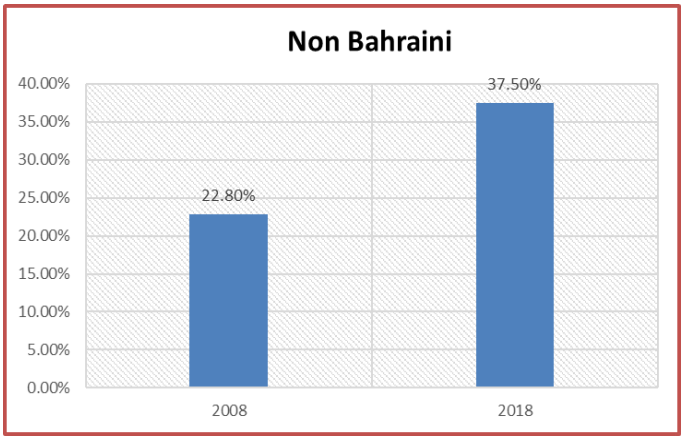


Figure 3: CS rate increased in Non-Bahraini women from 22.8% to 37.5%

Age, Gestational Age, Gravidity And Baby Weight:

Table 2: Descriptive statistics of age, Gestational age, Gravidity, and baby weight in years 2008 and 2018

		n	Mean	SD	Minimum	Maximum
2008	Age	1423	31.1	5.9	16	53
	Gestational age	1423	37.4	2.8	24	43
	Gravidity	1423	3.1	2.0	1	12
	Weight	1423	3048.4	769.1	590	6140
2018	Age	1962	31.0	5.8	13	53
	Gestational age	1962	37.5	2.7	24	49
	Gravidity	1962	3.0	1.8	1	12
	Weight	1962	3017.0	710.8	360	6270

Table 3: Distribution of age groups in the years 2008 and 2018

Age	2008	2018
	n (%)	n (%)
≤20	35 (2.5)	40 (2.0)
21 – 25	221 (15.5)	338 (17.2)
26 -30	429 (30.1)	559 (28.5)
31 – 35	402 (28.3)	534 (27.2)
36 – 40	245 (17.2)	393 (20.0)
41 – 45	85 (6.0)	87 (4.4)
>45	6 (0.4)	11 (0.6)
Total	1423 (100)	1962 (100)

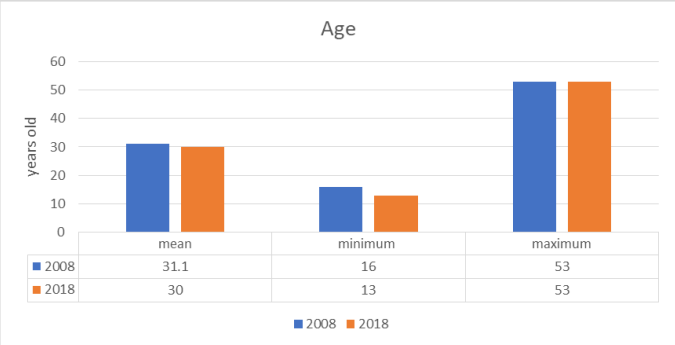


Figure 4: The differences between the mean ages, the minimum and maximum ages in 2008 and 2018

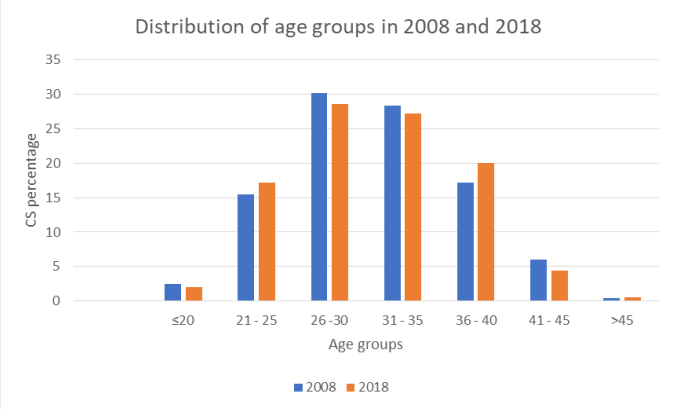


Figure 5: Comparison between the distribution of age groups in 2008 and 2018

In 2008, the 1423 women who had CS, classified into age groups. We have found their mean age was around 31.1 +/- 5.9 years old, the minimum age was 16 years old, and the maximum age was 53 years old (Table 2 and Figure 4). The highest age group was in between 26 to 30 years old (30.1%), and the lowest age group was among the elderly than 45 years old (0.4%) (Table 3 and Figure 5).

In 2018, the 1962 women who had CS, also classified into their age groups (Table 3), we have found the mean age was around 31 +/- 5.8 years old, the minimum age was 13 years old and the maximum age was 53 years old (Table 2 and Figure 4). The highest age group was also between 26 to 30 years old (28.5%), and the lowest age group was among the elderly than 45 years old (0.6%) (Table 3 and Figure 5).

In conclusion, there are no significant changes between their ages in both the years 2008 and 2018.

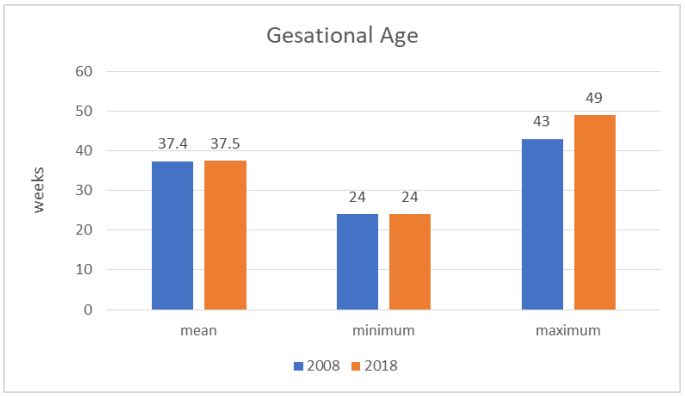


Figure 6: Comparison between the gestational age in 2008 and 2018

The mean gestational age (GA) in 2008 was 37.4 +/- 2.8 weeks, the minimum GA was 24 weeks, and the maximum is 43 weeks (Table 3 and Figure 6).

In 2018, The mean GA was 37.5 +/- 2.7 weeks, the minimum was also 24 weeks, and the maximum is 49 weeks, resulting in non-significant changes in both years (Table 3 and Figure 6).

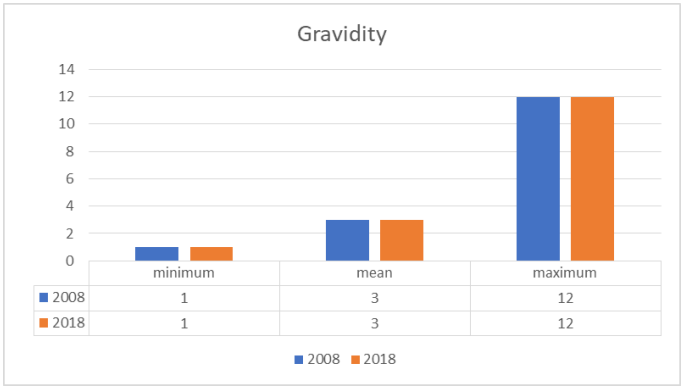


Figure 7: Comparison between the gravidity in 2008 and 2018

Women who were third gravidity +/- 2, are the most likely group who had CS in 2008, which is similar to in 2018 as it shows third gravida +/- 1.8, the ranges of the gravidity were between primigravida to the 12th (Table 3 and Figure 7).

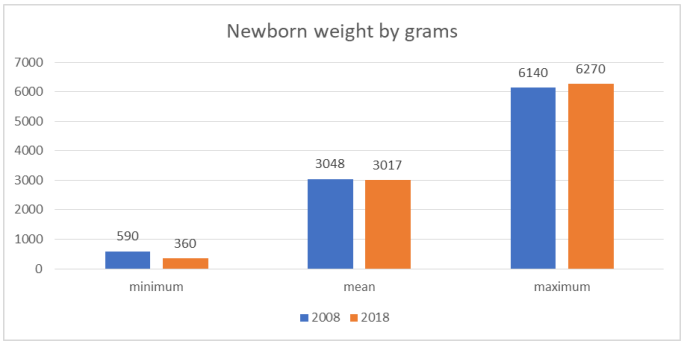


Figure 8: Comparison between the newborn weight in grams between 2008 and 2018

Newborn weight ranged from 590 to 6140 grams in 2008, the mean weight was 3048.4 +/- 769.1 grams, while in 2018, the newborn weight

ranged from 360 to 6270 grams, the mean weight was 3017 +/- 710.8 grams which is about the same (Table 3 and Figure 8).

Associated chronic illnesses or morbidities

Table 4: Associated chronic illnesses or morbidities in the years 2008 and 2018

Antenatal illnesses	2008	2018
	n (%)	n (%)
Dm or GDM	145 (10.2)	201 (10.2)
HTN or PIH	96 (6.7)	113 (5.8)
Induced by clomide or IVF or IUI	85 (6)	66 (3.4)
Hypothyroidism	15 (1.1)	49 (2.5)
Epilepsy	3 (0.2)	9 (0.5)
SCD or Anemia	26 (1.8)	47 (2.4)
Bronchial asthma	9 (0.6)	13 (0.7)
Hepatitis	7 (0.5)	1 (0.1)
Autoimmune disease such as chrons or rheumatoid	3 (0.2)	11 (0.6)
Others: uterine fibroid, previous fracture, APS, third degree peroneal tear, herpes	30 (2.1)	39 (2)
APH	21 (1.5)	19 (1)
Cardiac disease	12 (0.8)	11 (0.6)
No Morbidities	971 (68.2)	1383 (70.5)
Total	1423 (100)	1962 (100)

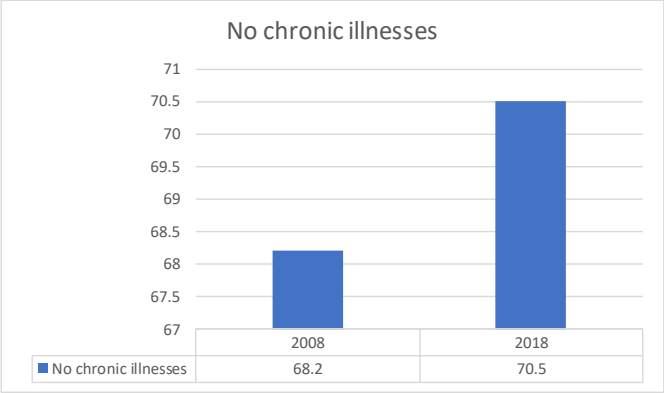


Figure 9: Increase CS in women who had not to have any associated illnesses or morbidities

In 2008 (68.2%) women comparing to (70.5%) women in 2018 who had CS, were not having any chronic illnesses or morbidities (Table 4 and Figure 9). However, the most frequent morbidity associated with CS, was diabetes mellitus, or diabetes arising in pregnancy (DM, GDM) which has shown the same rate in 2008 and 2018 (10.2%), following with hypertension or pregnancy-induced hypertension (HTN, PIH) which is 6.7% in 2008 and reduced to 5.8% in 2018 (Table 4).

CS rates increased among hypothyroidism patients from 1.1% to 2.5%, also women with epilepsy risen from 0.2% to 0.5%. SCD patients or anemic women showed an increase in their CS rate from 1.8% to 2.4%, bronchial asthma patients increased from 0.6% to 0.7%, autoimmune diseases increased from 0.2% to 0.6% (Table 4 and Figure 10). Patients who had hepatitis decreased from 0.5% to 0.1%. Also, women with cardiac disease decreased from 0.8% to 0.6%, and women with a history of antepartum hemorrhage (APH) decreased from 1.5% to 1% (Table 4 and Figure 10). Induced patients by Clomid or IVF were 6% in 2008 and reduced to 3.4% in 2018 (Table 4).

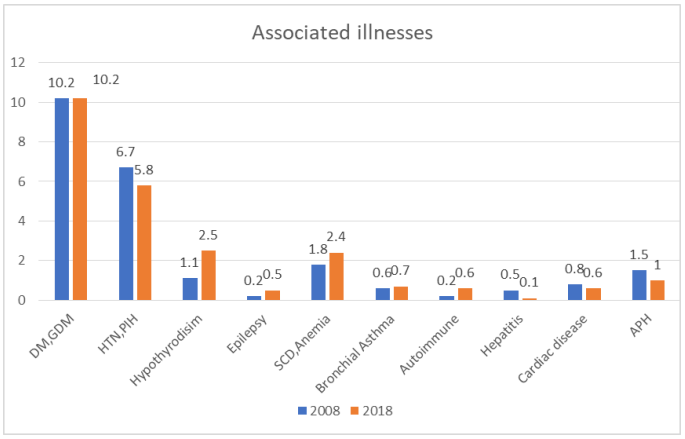


Figure 10: Comparison between 2008 and 2018 for the associated illnesses

Urgency of CS

Table 5: Urgency in the years 2008 and 2018

Urgency	2008	2018
	n (%)	n (%)
Emergency	995 (69.9)	1325 (67.5)
Elective	428 (30.1)	637 (32.5)
Total	1423 (100)	1962 (100)

Total emergency CS reduced from 69.9% to 67.5% and elective CS increased from 30.1% to 32.5% (Table 5 and Figure 11).

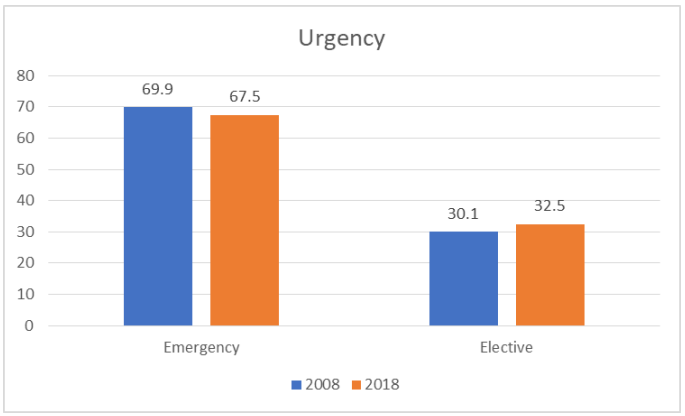


Figure 11: comparison between emergency and elective CS in 2008 and 2018

Indications of CS

Table 6: Indications in the years 2008 and 2018

Indications	2008	2018	Chi-Square P-value
	n (%)	n (%)	
Repeat CS	303 (21.3)	454 (23.1)	0.203
NRFHR	232 (16.3)	428 (21.8)	**<0.001**
Maternal request	145 (10.2)	297 (15.1)	**<0.001**
MAL presentation	182 (12.8)	198 (10.1)	**0.014**
FTP + CPD	121 (8.5)	123 (6.3)	**0.013**
Multiple fetus	98 (6.9)	115 (5.9)	0.225
Pervious 1 CS	84 (5.9)	78 (4)	**0.010**
Suspected macrosomia	67 (4.7)	41 (2.1)	**<0.001**
Late pregnancy bleeding	51 (3.6)	54 (2.8)	0.168

Pre-eclampsia and eclampsia	29 (2)	64 (3.3)	**0.032**
Scar rapture	12 (0.8)	32 (1.6)	**0.046**
FGR	19 (1.3)	5 (0.3)	**<0.001**
Other indications	80 (5.6)	73 (3.7)	**0.009**
Total	1423 (100)	1962 (100)	----------

There are highly significant differences between 2008 and 2018 in percentages of mothers with non-reassuring fetal heart rate (NRFHR), maternal request, suspected macrosomia, fetal growth restriction (FGR), and other indications. Also, there were significant differences between 2008 and 2018 in percentages of mothers with Mal-presentation, failure to progress (FTP) and cephalopelvic disproportion (CPD), pervious 1 CS, pre-eclampsia, and eclampsia, and scar rapture.

There were 16.3% of mothers in 2008, while 21.8% of mothers in 2018 have NRFHR. 10.2% of mothers in 2008, while 15.1% of mothers in 2018 have maternal request. 4.7% of mothers in 2008, while 2.1% of mothers in 2018 have suspected macrosomia. 1.3% of mothers in 2008, while 0.3% of mothers in 2018 have FGR. 12.8% of mothers in 2008, while 10.1% of mothers in 2018 have Mal presentation. 8.5% of mothers in 2008, while 6.3% of mothers in 2018 have FTP and CPD. 5.9% of mothers in 2008, while 4% of mothers in 2018 have pervious 1 CS. 2% of mothers in 2008, while 3.3% of mothers in 2018 have pre-eclampsia and eclampsia. 0.8% of mothers in 2008, while 1.6% of mothers in 2018 have scar rapture. 5.6% of mothers in 2008, while 3.7% of mothers in 2018 have other indications (Table 6 and Figure 12).

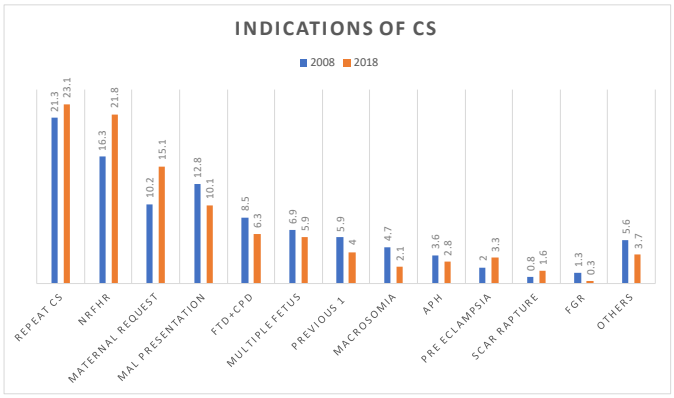


Figure 12: The differences between the indications in 2008 and 2018

The comments indications for CS among Bahraini and non - Bahraini women

Table 7: Indications in the years 2008 and 2018 among Bahraini and Non-Bahraini

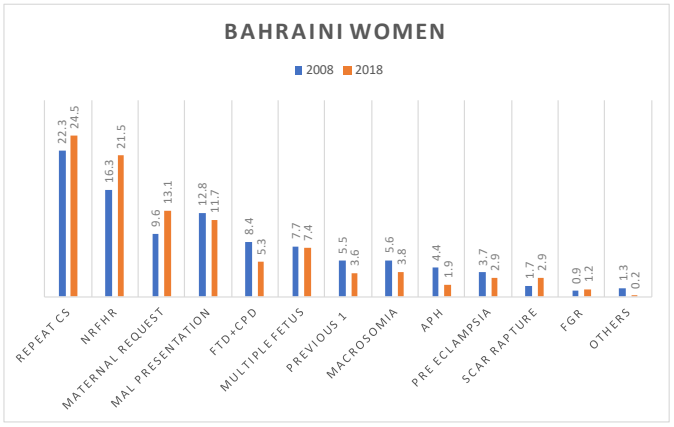
Indications	2008		2018	
	Bahraini	Non-Bahraini	Bahraini	Non-Bahraini
	n (%)	n (%)	n (%)	n (%)
Repeat CS	245 (22.3)	58 (17.8)	300 (24.5)	154 (20.9)
NRFHR	179 (16.3)	53 (16.3)	264 (21.5)	164 (22.3)
Maternal request	105 (9.6)	40 (12.3)	160 (13.1)	137 (18.6)
Mal presentation	140 (12.8)	42 (12.9)	144 (11.7)	54 (7.3)
FTP + CPD	92 (8.4)	29 (8.9)	65 (5.3)	58 (7.9)
Multiple fetus	84 (7.7)	14 (4.3)	91 (7.4)	24 (3.3)
Pervious 1 CS	60 (5.5)	24 (7.4)	44 (3.6)	34 (4.6)
Other indications	61 (5.6)	19 (5.8)	47 (3.8)	26 (3.5)
Suspected macrosomia	48 (4.4)	19 (5.8)	23 (1.9)	18 (2.4)
Late pregnancy bleeding	41 (3.7)	10 (3.1)	35 (2.9)	19 (2.6)
Pre-eclampsia and eclampsia	19 (1.7)	10 (3.1)	35 (2.9)	29 (3.9)
Scar rapture	10 (0.9)	2 (0.6)	15 (1.2)	17 (2.3)
FGR	14 (1.3)	5 (1.5)	3 (0.2)	2 (0.3)
Total	1098 (100)	325 (100)	1226 (100)	736 (100)

The Total Bahraini women who had CS in 2008 were 77.2% and decreased to 62.5% in 2018. In non- Bahraini women are the opposite as in 2008, the rate was 22.8% and increased to 37.5% in 2018 (Figure 2 and Figure 3).

The comments indications for CS among Bahraini women in 2008 were repeated CS (22.3%) followed NRFHR (16.3%) and malpresentation (12.8%). However, in 2018, the most frequent indications among Bahraini women were also repeated CS increased to (24.5%) followed by NRFHR (21.5%), and maternal request (13.1%) (Table 7 and Figure 13).

In non -Bahraini women, the comments indications in 2008 were repeated CS (17.8%) followed by NRFHR (16.3%) and malpresentation (12.9%). In 2018, the comments indications among non-Bahraini women were NRFHR (22.3%) followed by repeated CS (20.9%) and maternal request (18.6%) (Table 7 and Figure 14).

Figure 13: The indications of CS in Bahraini women in 2008 and 2018



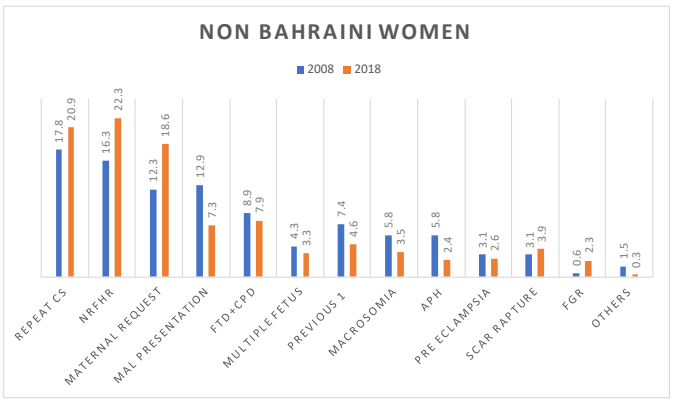


Figure 14: The indications of CS in Non-Bahraini women in 2008 and 2018

The Outcome : Women who had CS without complications have increased from 82.6% to 85.6%, rate of NICU admission decreased from 16% to 13.1%, PPH (postpartum hemorrhage), and hysterectomy rates remained the same in 2008 and 2018 which are 0.6% and 0.3%.

The rate of both NICU admission and PPH was 0.5% in 2008 and 0.4% in 2018.

90% of hysterectomies in 2018 were due to placenta accrete (Figure 15).

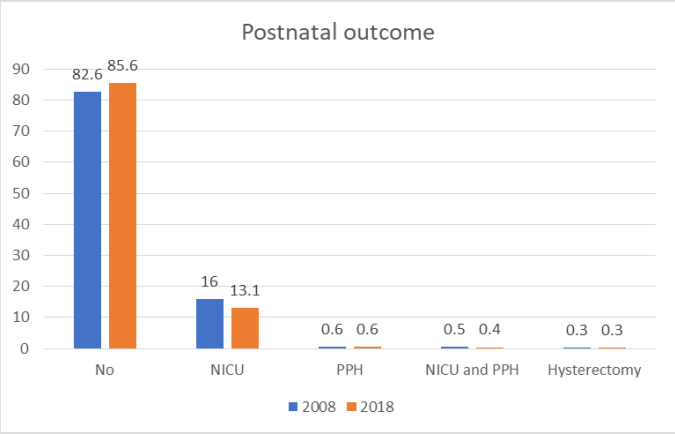


Figure 15: Post-CS outcome in 2008 and 2018

DISCUSSION

CS rates have been increasing globally for years, our rate in 2018 reached 32.8%, which is double the recommended rate according to WHO[1], other regions rate has exceeded more than half of the deliveries in Brazil, Egypt and Turkey[3,6,7,57]. Some countries remained without exceeding the recommended rate, such as west and central Africa 4% and 6.2% in South Africa[3].

In the kingdom of Bahrain, CS rates have increased among non -Bahraini women from 22.8% to 37.5% and decreased among Bahraini women from 77.2% to 62.5%. Studies showed CS increase among advanced maternal age[58-61], in our study, the lowest CS rate was among the advanced maternal age group in both years, and the highest rate of CS was among (26-30 years old). Just like in Brazil, most of our CS were among the third gravidity in both years, which raises a concern that it could be due to demanding for CS and fearing from the delivery experiences[62,63].

In 2018 the lowest newborn weight in CS was 360 gm and 590 grams in 2018, studies showed low birth weights don't improve the outcome, and it can increase the risks of respiratory distress syndrome, giving no justification for the rising trend according to the birth weight[64].

Although CS is 1.52 times higher in GDM and 20% higher in DM, our CS rates have not changed among women with GDM or DM which is (10.2%) in both years[65,66]. Hypertensive, preeclamptic, and eclamptic patients' rate in Bahrain decreased from 6.7% to 5.8%, which supports the studies resulted such illness doesn't necessitate CS[67,68].

Our CS rate increased in hypothyroidism patients from 1.1% to 2.5%, which supports the evidence of such illness could increase CS rates[69,70]. Also, our rates have increased among epileptic patients from 0.2% to 0.5%, proving epilepsy is a risk factor[71,72]. Sickle cell anemia CS rate has increased from 1.8% to 2.4%, which supports the fact that the CS rate is higher among SCD women than non- diseased[73,74]. There is no significant difference in CS rate between both years in bronchial asthma patients, which supports such patients have a higher incidence in instrumental delivery rather than CS[75]. Autoimmune diseases such as chrons, ulcerative colitis, rheumatoid arthritis are known to have a higher incidence of CS than non-diseased, which is similar to our results[76,77]. Women with hepatitis CS rates have decreased in Bahrain, although the mode of delivery for such cases remains controversial[78,79]. Planned CS doesn't add any advantage to cardiac diseased pregnant women; our rate has decreased from 0.8% to 0.6%[80]. Despite all the antenatal associated morbidities, results showed the women who had not to have any medical illnesses are the majority who end with CS. Their rate has been increased from 68.2% to 70.5%, raising the question of justification.

NRFHR CS or fetal distress (FD) accounts for 2.43% of total deliveries in different populations[81]. It refers to the fetus gets compromised due to inadequate nutrition or insufficient oxygen; consequences such as stillbirth or cerebral palsy are possible. In Bahrain, FD is the leading cause of the increasing rate. It has dramatically increased from 16.3% to 21.8% (p-value <0.001). Primi gravida women are more likely to have fetal distress. Our primi gravida women reached 50.6% in 2010[82]. Another risk factor for FD is maternal age, particularly if it's above 40 years old[83], which is the lowest CS group in our study. In USA fetal distress is the leading indication for their rising trend, their rate reached 32%[46], as well as India which reached 29.1%[84] FD is the second most common indication for the rising trend in Bangladesh, their rate reached 20.6%[85]. Using of antenatal surveillance such as biophysical profile. Nonstress test, CTG intrapartum, and fetal blood sampling is recommended to reduce the NRFHR.

Our second indicator for our rising rate is the maternal request, which has increased from 10.1% to 15.1% (p-value <0.001). Demanding for CS due to fearing from the pain or due to their previous experience in labor became a trend in the countries which have the highest CS rates. In Brazil, Egypt, and Turkey, their main indication for CS is maternal request[86-88]. Studies revealed, the unnecessary CS got an advantage in the private sectors as risks were not explained[89]. Therefore, explaining to the pregnant women the delivery, risks, and complications of CS is advisable to reduce their fear and unnecessary CS[90].

Repeated CS is a consequence of justified CS, such as FD and non -justified CS such as maternal request; our rate has increased from 21.3% to 23%. It considers the highest indication in both years though there was not a significant rise in the rate. In KSA, they studied their rising trend and resulted in previous CS (54.3%), and difficult labor (35.9%) were their main indications[91].

A study proved the increase rates of repeated CS were due to previous one CS who ended with FD, scar tenderness, CPD, maternal request, and also due to increasing rates of previous two and more CS[92]. Our previous one CS rate reduced from 5.9 % to 4. Patients with previous one CS are advised to have Vaginal birth after cesarean section (VBAC) according to the guidelines, and they should only be taken for only under emergency conditions[90].

Malpresentation is defined as a baby who is not laying in a vertex position. It includes breech presentation, face, brow, and transverse lie. Risks factors are multipara, polyhydramnios, previous malpresentation, fetal, and uterine anomalies[93]. It usually ends with CS to avoid morbidities such as shoulder dystocia. Although our rates have significantly reduced from 12.8% to 10.1%, some countries reach 3% only[92], suggesting to follow the guidelines in applying external cephalic version (ECV) to reduce avoidable CS[94].

Cephalo pelvic desorption (CPD) is diagnosed when the mother's pelvis is small, usually during labor. According to the American College of Nurse-Midwives (ACNM), CPD incidence is 1 out of 250 pregnancies. They also revealed that more than 65% of women with suspected CPD deliver normally[95]. In our study, the CPD rate has decreased from 8.5% to 6.3%, supporting the research that shows using partograph reduce CS rate up to 31%[85].

Twin pregnancies are at higher risk of maternal and neonatal complications such as gestational hypertension and preeclampsia, preterm birth, low birth weight, perinatal death, low 5-min Apgar score, neonatal seizures, and respiratory morbidity et al Yu Dong. In favorable situations, vaginal deliveries showed to be slightly higher than in CS[96], which is almost similar to ours, as our CS rate has reduced from 6.9% to 5.9%.

Macrosomia is when the fetus's weight reaches 4000 gm, and more or above the 90% percentile. GDM or DM considers risk factors. CS is recommended in such cases to avoid shoulder dystocia, and other complications. Based on ACOG, DM or GDM fetuses have a greater risk for asphyxia, meconium aspiration, and brachial plexus injury[97]. Our rate has scientifically decreased from 4.7% to 2.1%, although the ratio of GDM or DM mothers in both years remained the same 10.2%. In Turkey, the prevalence of macrosomia has increased, reaching 8.6%, especially among high BMI in pre-pregnancy[98].

Antepartum hemorrhage due to placenta previa or accrete or abruption are critical cases that could end with significant maternal and fetal morbidity or mortality. Rates of accrete increase with repetitive CS, the overall risk is 3% in primary CS reaches 67% in repetitive CS[55], our rate has decreased from 3.6% to 2.8%.

The overall incidence of uterine rupture in the previous one CS is 0.5%, ranging from 0.2% in high-Human Development Index (HDI) countries to 1.0% in low-HDI countries et al Motomura, K[99]. Factors associated with uterine rupture are educational level, onset of labor, gestational age, especially preterm, limited resourced countries[99]. Complications such as maternal and perinatal mortalities and morbidities are expected in the case of uterine rupture. Our rate has unfortunately increased from 0.8% to 1.6%.

Preeclampsia is common; around one in 200 women (0.5%) develop severe pre-eclampsia during pregnancy[100]. A recent study compared CS rate in pregnancy associated with hypertension (PAH), and without any diseases, the result showed (PAH) is a significant factor for CS[101]. Our study supports the finding as our rate increased from 2% to 3.3%.

Fetal growth restriction (FGR) is sometimes considered one of the complications of preeclampsia. However, our rate has dramatically reduced from 1.3% to 0.3%. A study reported women who were taken for CS for fetal distress appeared to carry a restricted growth fetus[102]. Another study showed there is no difference in the outcome between the induction of labor or CS among FGR[103].

KSA reported they have higher emergency CS 67% than 33% elective[91], which is similar to our rates as our total emergency CS reduced from 69.9% to 67.5%, and elective CS increased from 30.1% to 32.5%[91] suggesting the main indications for emergency sections were FD and APH, and the electives due to repetitive CS in both countries.

AS a result, the rate of hysterectomies was the same in 2008 and 2018, which were 4 in 2008 and 5 cases in 2018, the most prevalent cause was accrete. PPH rate has not changed, which is 0.6%. In KSA, blood transfusion was the most frequent adverse outcome[91]. CS without complication rates increased from 82.6 % to 85.6 %. NICU admissions decreased from 16% to 13%, which is opposite to KSA, as the comments adverse outcome besides blood transfusion was the NICU admission for FGR[91].

CONCLUSION

CS is becoming a trend in worldwide; it could lead to further morbidities and mortalities. Our rate has dramatically increased from 22.4% to 32.8% from 2008 to 2018.

There are highly significant differences between 2008 and 2018 in percentages of mothers with non-reassuring fetal heart rate (NRFHR), the rate increased from 16.3% to 21.8% (p-value < 0.001) and maternal request which increased from 10.2% to 15.1% (p value < 0.001). The most typical indication for the population in Bahrain is repeated CS.

There are also significant differences in suspected macrosomia, fetal growth restriction (FGR). Additionally, Mal- presentation, failure to progress (FTP) and cephalopelvic disproportion (CPD), pervious 1 CS, pre-eclampsia and eclampsia, and scar rapture.

Women without any medical illnesses are the highest population who end with CS; their rate was 68.2% in 2008 and reached 70.5% in 2018.

Our outcome without complicated PPH or NICU admission is higher in both years, which is 82.6% and 85.6%.

RECOMMENDATIONS

In the aim to reduce our rate, it is recommended to implant fetal blood sampling in our tertiary hospital, to reduce unjustified FD CS.

To create guidelines, apply it to the team, to improve the management and the decision for taking them to CS.

To minimize the fears among pregnant women by discussion, to recognize their concerns, and to explain the risks if the patient is still insisted on CS, she should be referred to the consultant, and if needed, to take another opinion from another consultant as advised by RCOG guidelines.

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