



Caesarean Section Trend in a Selected Hospital between 2014 And 2019: Observational Study

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ABSTRACT

Caesarean section is a life-saving surgical procedure that can prevent complications and mortality of maternal and new-born when used for clinically indicated reasons. this study aimed to describe trends in caesarean section in private hospital under study from 2014 to 2019 Sana'a, Yemen. This study conducted as a retrospective observational study, The study population was all pregnant women admitted to labour room and gave birth between March 2014 and September 2019, and used secondary data on defined period, for 3,740 pregnant women admitted to labour room and gave birth by vaginal delivery or caesarean section. The data were analysed using Microsoft Excel and IBM SPSS Statistics software version 26.0. The results of this study found that the total mean of CS rate for period of 2014 to 2019 was 65% of total deliveries, the associated factor with the caesarean section was the maternal age (P-value <,000). Also, there was a significant relationship exists between Length of Stay and mode of delivery across various age groups. Further, studies are recommended to identify determinants, indications of CS and nonclinical factors, affecting CS rate in the same hospital and others.

CONTENTS

1. Introduction
2. Materials and methods
3. Findings
4. Discussion
5. Study limitations
6. Conclusion
7. References

1. Introduction

Caesarean section is a life-saving surgical procedure that can prevent complications and mortality of maternal and newborn when used for medically indicated reasons. The caesarean section rate is the number of total caesarean deliveries performed per 100 live births[1]. Also, CS is a major surgery and associated with immediate maternal and perinatal risks and may have implications for future pregnancies as well as long term effects that are still being

investigated. [2]; [3][1]. Globally, an estimated 6.2 million unnecessary cesarean sections (CS) are performed each year, at an approximate cost of 2.3 billion US dollars[4] [5]. The induction of labour should be reserved for specific medical indications. No region should have rates of induced labour higher than 15% [6].

Caesarean section rates have increased dramatically worldwide over the last decades, an invariable upward trend has been evident mainly in low- and middle-income countries, China

(64.1%), Columbia (46.4%), Egypt (51.8%), Iran (47.9%) and Brazil (55.6%)[7]. compared with the estimations by the WHO, with a mean of 45.2% of CS worldwide[8]. Even with the lack of evidence supporting substantial maternal and perinatal benefits with CS. On the opposite of that, some studies had shown a link between increasing CS rates and poorer outcomes, and may be associated with increased maternal and perinatal morbidity. a higher risk with short- and long-term risks that can extend many years beyond the current delivery and affect the health of the woman, the child and future pregnancies[9]; [2][1].

There is no justification for any region to have a rate of CS higher than 10–15% based on the statement by a panel of reproductive health experts at a meeting organized by the World Health Organization in 1985. the international health-care community has considered that ideal rate for caesarean section. Although, the ideal or optimal caesarean rate is unknown, WHO emphasizes that caesarean section is effective in saving maternal and infant lives, but only when it is used for clinically indicated reasons. Ultimately, every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate. This is the first WHO guideline on non-clinical interventions to reduce unnecessary caesarean sections – i.e. those performed in the absence of medical indications[10].

The situation is aggravated by the fact that the causes of the CS rise are not fully understood but emerge as a complex multifactorial labyrinth involving health systems, health care providers, women, societies, and even fashion and media[10]. There are contributing factors, are include, first: Changes in the characteristics of the population such as increase in the prevalence of obesity and of multiple pregnancies, and increase in the proportion of nulliparous women or of older women or in multiple births, second: Differences in style of professional practice, and Organizational, economic, social and cultural factors[3]; [2]; [10]. Third: Non-clinical factors

such as women increasingly wanting to determine how and when their child is born, differences in health provider practices[3]; [10]. Fifth: Generational shifts in work and family responsibilities, Physician factors, increasing fear of medical litigation, and Proper counseling and fear of pain [11]. Sixth: increasing malpractice pressure, Maternal factors may include age, pre-existing comorbidities, previous cesarean section and health conditions acquired during pregnancy, among others. And related to the child include fetal anomalies, macrosomia and restricted intrauterine growth. Obstetric factors such as premature placental displacement, cord prolapse and hemorrhages[9]. Seventh: Some study suggest that there is a need for change in the attitude of clinicians before attempting to educate women regarding the caesarean section for non-medical reasons[12]. Eighth: the last cause for increase CS include the rise in first births among older women and in multiple births resulting from assisted reproduction, malpractice liability concerns, scheduling convenience for both physicians and patients[1].

The rise in caesarean section rates is a universal problem. It affects low-, middle- and high-income countries, although the consequences of unnecessary caesarean sections may be different across settings and countries, depending on the human or financial resources available, and the capacity to perform caesarean section safely and to manage associated complications. And can be cause some Risks and complications include:

- Maternal death, the greater number of hospital readmissions and increases the risk in future pregnancies for placenta previa. Respiratory distress syndrome and chronic diseases that occur more frequently in babies born by CS [8]. Every year 300 000 women die during childbirth. Of these, 99% are from low-income and middle-income countries (LMICs). Because, of the lack of resources and trained personnel needed for management of the complications [13]; [14].

- As with any surgery, CS is associated with short- and long-term risks, particularly in settings that lack the facilities or capacity to conduct safe surgery or treat surgical complications properly, or where access to labour care or repeat CS in subsequent pregnancies cannot be taken for granted. On the other hand, inadequate access to timely CS may result in perinatal asphyxia, stillbirth, uterine rupture or obstetric fistula, a marker for exceptionally prolonged, obstructed labour[10].
- In April 2015, WHO released a new statement summarizing the results of systematic reviews and analysis of the available data on caesarean births and concluded that, CS rates higher than 10% were not associated with reductions in maternal and newborn mortality rates. The Statement notes, however, that the association between CS rates and other relevant outcomes such as stillbirths, maternal and perinatal morbidity, pediatric outcomes and psychological or social well-being could not be determined due to the lack of data on these other outcomes at the population level[10].

The results of some studies found that private hospitals tend to perform more caesarean sections than public hospitals, and CS more likely to be performed in privately insured women as compared with women using public health insurance coverage [1]; [15]; [8]. In order to reduce C-section rates, efficient delivery care policies mainly focused on the private sector are necessary.[16].

The annual statistical report 2010, 2011 for medical records department of Al Thawrah Hospital as governmental hospital show that CS rate was 17.52%, 17.55%, while vaginal deliveries were 76.22%, 77.01% and the other vaginal deliveries as (twins' baby and dead births) were 6.26%, 5.44% (annual statistical report 2010, 2011). and because the most of studies, especially in LMI countries, prove that

the rate of CS is high in private hospitals if compared to public hospitals as mention before in this study. According to our knowledge, there is no previous study in Yemen about rate and trend of CS in private hospitals. so, this study aimed to describe trends in CS in private hospital under study from 2014 to 2019.

2. Materials and methods

Study design, setting, sampling, and data collection

A retrospective Observational Study was conducted to investigate the population of pregnant women who were admitted to a private hospital under study in Sana'a city and gave birth between March 2014 and September 2019. The study relied on secondary data collected during this period and included 3,740 pregnant women who gave birth either vaginally or through caesarean section. Out of the total, 56 patients were excluded from the study due to incomplete data. The final sample size for the study was 3,684 pregnant women who had complete data.

Measure and variables

The study utilized secondary data collected from the hospital, which included information such as maternal age, date of admission and discharge. The researcher calculated the number of admissions and hospital length of stay based on these dates. The study had several variables defined as follows: Dependent variable - mode of delivery (vaginal delivery and caesarean section) Independent variables - maternal age (<20, 20-30, 30-40, 40-50 years), length of stay (<1, 1-2, 2-3, and >4 days).

Data analysis

Descriptive statistical analyses of the data were conducted using Microsoft Excel 97-2003 and IBM SPSS Statistics software version 26.0. The analyses included frequency distributions, to test hypotheses related to the differences in mode of delivery based on independent variables, appropriate hypotheses were formulated. Hypothesis testing was conducted using filcher

test to examine relationships between (LOS and delivery types) and (age of groups with LOS).

3. Findings

A total of 3,684 deliveries were included in this study after excluding 56 cases out of the 3,740 collected. The distribution of women according to age was 48% in the 20-30 years age group, 45% in the 30-40 years age group, 5% in the 40-50 years age group, and only 2% in the <20 years age group (see Table 1).

Table 1 Age groups distribution

Age groups distribution		N	Percent
Age	20 - 30 year	1769	48.0
	30 - 40 year	1639	44.5
	40 - 50 year	194	5.3
	< 20 year	82	2.2
	Total	3684	100.0

The study found that the overall vaginal delivery rate was 35%, while caesarean section delivery rate was 65% (Table 2). Among the types of caesarean delivery, the first caesarean section had the highest percentage 44.3% (Table 2). The second caesarean section was 14.1%, while the third caesarean section was 4.9%, and more than third caesarean sections were less than 2%.

Table 2 Mode of delivery distribution

Mode of delivery distribution		N	Percent
Mode of delivery	First cesarean section	1631	44.3
	Second cesarean section	520	14.1
	Third cesarean section	180	4.9
	4th cesarean section	38	1.0
	5th cesarean section	13	.4
	6th cesarean section	3	.1
	Vaginal delivery	1299	35.3
	Total	3684	100.0

The rate of CS to vaginal delivery varied by year of admission, with 57.14% CS and 42.86% vaginal delivery in 2014, 63.11% for CS and 36.89% for vaginal delivery in 2015, 63.09% CS and 36.91% vaginal delivery in 2016, 59.60% CS and 40.40% vaginal delivery in 2017, 69.87% CS and 30.13% vaginal delivery in 2018, and 74.63% for CS and 25.37% for vaginal delivery in 2019 (Figure 1).

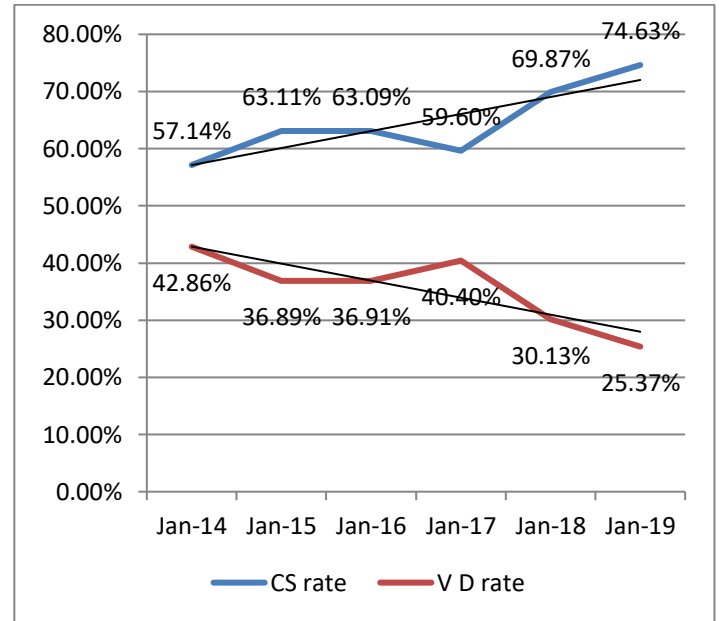


Figure 1 caesarean section trend 2014- 2019 in selected hospital

Furthermore, the average length of stay (LOS) in the hospital for deliveries was 45.6% for less than one day, 17.3% for 1-2 days, 27.4% for 2-3 days, and 9.7% for more than 3 days (Table 3). The total mean hospital LOS for all deliveries was 2.03 days, with a mean LOS of 2.46 days for CS deliveries and 1.31 days for post-vaginal deliveries. The mean LOS for the 20–30-year age group was 1.92 days, followed by the <20-year age group with a mean LOS of 2.06 days, then the 30–40-year age group with a mean LOS of 2.10 days, and finally the 40–50-year age group with a mean LOS of 2.36 days.

Table 3 Length of stay Distribution

Length of stay Distribution		N	Percent
LOS	< one day	1681	45.6
	1 day - 2 day	637	17.3
	2 day - 3 day	1008	27.4
	> 4 day	358	9.7
	Total	3684	100.0

4. Discussion:

The objective of this study was to investigate the patterns in caesarean section (CS) rates, which have been on the rise globally, according to several systematic reviews and studies [8]; [7];

[13]; [5]; [2]; [4]; [15]; [17][1]. Our study's findings align with this trend, as CS rates increased from 2014 to 2015, decreased slightly from 2016 to 2017, and then increase again from 2018 to 2019, with a rate of 74.63% of all deliveries in the last year (2019). The CS rate for the period of 2014-2019 was 64.74% and 35.3% for vaginal delivery (Figure 1), which means that out of every three deliveries two of them are CS.

The rate of cesarean section (CS) was found to be significantly associated with maternal age. Women under 20 years old and those between 40 to 50 years old had the highest rates of CS (75.61% and 69.59%, respectively). Moreover, the frequency of second, third, and fourth CS was higher among women aged 20 to 30 years old. These findings align with previous studies by [8]; [18]; [19]; [16]; [20]; [21]; [22]. that also found a relationship between maternal age and mode of delivery. However, one study [11] did not show any significant association between mode of delivery and maternal age. The primary cesarean delivery rate was found to account for most of the cesarean deliveries, with a rate of 68% of total CS. Consequently, when the rate of primary cesarean section is high, subsequent pregnancies are more likely to be cesarean deliveries for the same mothers, as reported by [18].

Mode of delivery and hospital LOS according to age groups

In this study, the average Hospital LOS for women who gave birth was 2.01 days. Interestingly, 45.6% of the women stayed in the hospital for less than a day after delivery, even though postnatal care is typically required during this time. Short hospital stays can be risky as they may not provide enough time for detecting, diagnosing, or treating complications after surgery. However, in cases where the mother is stable and healthy, and there are no problems or diseases, the Hospital LOS can be reduced to 24 hours after surgery, according to[23]. Moreover, the women who stay in hospital (>4 days) as the longest LOS in this study was 9.75% of total. Also, this study's results demonstrated a significant association between a woman's age and the length of her hospital stay, which is consistent with findings from previous studies such as[24]; [25]; [20]; [9].

The association between length of stay (LOS) and mode of delivery within different age groups was examined using Fisher's Exact Test, yielding a statistically significant P value of .001 (less than 0.05). Therefore, a significant relationship exists between LOS and mode of delivery across various age groups (refer to tables 4, 5, and 6). Additionally, the LOS for mothers undergoing normal delivery was found to be longer than those undergoing 3rd, 4th, 5th, or 6th cesarean sections, particularly in relation to age group.

Table 4 Association between length of stay (LOS) and mode of delivery according to age

Mode of delivery * LOS * <20 Age group		LOS				X ²	P value
		< one day	1 day - 2 day	2 day - 3 day	> 4 days		
Mode of delivery	first cesarean section	268	199	299	88		
	second cesarean section	37	64	105	13		
	third cesarean section	3	13	22	11		
	4th cesarean section	0	1	2	1		
	5th cesarean section	0	0	1	0		
	6th cesarean section	0	0	1	0		
	normal delivery	555	38	36	12		
Fisher's Exact Test						626.460	.000

Table 5 Association between length of stay (LOS) and mode of delivery according to age

Mode of delivery * LOS * 20 - 30 Age group		LOS				X^2	P value
		< one day	1 day - 2 day	2 day - 3 day	> 4 day		
Mode of delivery	first cesarean section	156	126	241	116		
	second cesarean section	39	78	114	35		
	third cesarean section	9	27	58	22		
	4th cesarean section	3	2	19	5		
	5th cesarean section	0	5	2	2		
	6th cesarean section	1	0	0	0		
	normal delivery	510	32	24	13		
Fisher's Exact Test						767.809	.000

Table 6 Association between length of stay (LOS) and mode of delivery according to age

Mode of delivery * LOS * 40 - 50 Age group		LOS				X^2	P value
		< one day	1 day - 2 day	2 day - 3 day	> 4 day		
Mode of delivery	first cesarean section	13	18	23	4		
	second cesarean section	1	1	1	1		
	normal delivery	18	0	2	0		
Fisher's Exact Test						31.616 ^g	.000

5. Study limitations

This study has certain limitations. Firstly, it was conducted only in one private hospital, and the findings cannot be generalized to other hospitals. Secondly, the study used secondary data from electronic health records, which limited the analysis to the available variables in the database. Certain influential variables such as clinical and nonclinical indications of CS, standardized classification and indications of CS, socioeconomic factors like health insurance, education, and demographic data like the place of residence were not included in the study due to unavailability of data. As a result, the study was unable to analyze all the potential determinants related to medical need, facilities, providers, or health system and could not make comparisons with other studies. Therefore, this study is descriptive and does not explain the determinants and indications that affect the true classification of CS. Further studies with larger sample sizes and standardized data that include determinants and indications of CS are recommended.

6. Conclusion

The study findings revealed that the cesarean section (CS) rate for the period of 2014 to 2019 was more than sixty percent of all deliveries, which means that out of every three deliveries two of them are CS, with a rising trend from 2014 to 2019. Maternal age was found to have a significant association with the CS rate, and there was a significant relationship exists between LOS and mode of delivery across various age groups. Furthermore, this study has limitations, such as being conducted only in one private hospital and the use of secondary data. Thus, further research is needed to determine the determinants and indications of CS, including nonclinical factors, across various hospitals and to develop strategies to minimize inappropriate CS rates and hospital costs while improving health outcomes.

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