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**Research Article**

# NEONATAL OUTCOME AFTER FIRST CESAREAN DELIVERY AT BENGHAZI GOVERNMENTAL HOSPITALS, LIBYA

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**Abstract**

**Background:** Women seeking VBAC may find limited options in hospital. There is increasing trend globally for CS. In Benghazi, little is known about neonatal outcomes among those delivered vaginaly post caesarean section. **Objectives:** To describe the pattern of neonatal outcomes following a trial of vaginal deliveries after one previous cesarean delivery in Benghazi government owned hospitals and to compare differences in neonatal outcome. **Study Design:** Retrospective cohort study including all mothers presented or referred for delivery in Benghazi governmental hospitals (Benghazi medical center and Jomhoria hospital) with previous history of cesarean section (para 1). **Statistical analysis:** Analysis shall include description of study parameters in terms of means or medians with standard deviations and limits or proportions. For comparison purposes, chi- square tests for difference would be calculated for different types of procedures using significant level if P≤ o.o5. **Results**: Higher proportion of cases aged less than 31 years; their babies had good Apgar score compared to those aged more than 31 years. There is statistically significant difference between Apgar score of cases with normal type of placenta and other types of placentas. There was significant difference between babies with meconium or bloody stain and those without regarding their Apgar score. P= 0.003. A higher proportion (21.4 %) of cases that had meconium or bloody stained amniotic fluid had bad neonatal outcome. This difference was statistically significant. P = 0.00. There was significant statistical difference between abnormal liquor amount and bad neonatal outcome. P= 0.008. There was significant statistical difference between mode of present delivery and Apgar score. P= 0.053. There was significant statistical difference between mode of present delivery and bad neonatal outcome.

**Keywords:** Meconium, Apgar.

## INTRODUCTION

Cesarean Section (CS) is an obstetric procedure applied to warrant the well- being of the pregnant mother and her baby when indicated. It is considered as a life-saving surgical procedure when certain complications arise during pregnancy and labour. [1- 4]

**Prevalence of cesarean section globally:**

In 1985 in Fortaleza, Brazil, the World Health Organization (WHO) organized a meeting attended by a panel of reproductive health experts. They agreed that the ideal rate for CS to be between 10% and 15%. Consequently, for the following 30 years, the international healthcare community has considered that rate to be the ideal one. [5] Subsequently, CSs have become progressively common in both developed and developing countries for a variety of reasons. [6,7] Caesarean section can successfully prevent maternal and perinatal mortality and morbidity, when it is indicated. [8] Cesarean sections are surgical interventions that could be associated with short- and long-term risks. These risks can extend many years affecting the health of the woman, her child, and future pregnancies and may carry burden on women with limited access to comprehensive obstetric care [9, 10, 11]. Over the past thirty years, there has been building up of more evidence on the benefits and risks of caesarean sections.

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This was accompanied by, significant improvements in clinical obstetric care. Thus, the health care professionals, scientists, epidemiologists and policy-makers communicated and decided that there is a need to reconsider the 1985 recommended rate [12, 13]. Nevertheless, determining the adequate caesarean section i.e. the minimum rate for medically indicated caesarean section, while avoiding medically unnecessary operations – is a challenging task. To answer this question, WHO conducted two studies: a systematic review of available country-level studies that had sought to find this rate, and a worldwide country level analysis using the latest available data. WHO reported that; Caesarean sections are effective in saving maternal and infant lives, when there are medical indications. At population level, there are no reductions in maternal and newborn mortality rates, if CS rates are higher than 10%. At health care settings with limited facilities and/or capacity to properly conduct safe surgery and treat surgical complications, CS may lead to major and sometimes permanent complications, disability or death. Therefore, C S should only be carried out when medically necessary and women are in need, rather than endeavoring to achieve a specific rate. Though, many researchers have been carried out to study the effects of CS rates on maternal and perinatal morbidity, pediatric outcomes, and psychological or social well-being, still needs more clarifications. As a result, more researches are needed to understand the health effects of caesarean section on immediate and future outcomes [14]. Betrán et al, collected nationally-representative data from 150 countries on CS rates between1990 to 2014 and calculated regional and sub regional weighted averages. [15] They reported that, currently 18.6% of all births occur by CS, ranging from 6% to 27.2% in the least

and most developed regions, respectively. The highest CS rates (40.5%) were calculated from Latin America and the Caribbean region, followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%) and Africa (7.3%) [15]. Based on the data from 121 countries, the trend analysis showed that between1990 and 2014, the global average CS rate increased 12.4% (from 6.7% to 19.1%) with an Average Annual Rate of Increase (AARI) of 4.4%. Both, Latin America and the Caribbean had the largest absolute increases (19.4%), the CS rates increased from 22.8% to 42.2, followed by Asia (15.1%, from 4.4% to19.5%), Oceania (14.1%, from18.5% to 32.6%), Europe (13.8%, from 11.2% to 25%), Northern America (10%, from 22.3% to 32.3%) and Africa (4.5%, from 2.9% to7.4%) [15].

**Prevalence of cesarean section in Arab and African countries:**

At country level, Egypt, Tunisia and Morocco witnessed the largest rise in the African region. CS rates in Egypt rose from 4.6 % to 51.8 % (47.2 points) over the 24-years period. Along with Morocco, these two countries had the largest worldwide AARI in CS rates (11.6%) [15]. On the other side of the spectrum, Zambia (from 2.6% to3%), Niger (from 0.9% to1.4%) and Burkina Faso (from 1.3% to1.9%) were the countries with the smallest absolute increase in CS rates (only half point). In Asia, the countries with the smallest absolute increases were Cambodia, Tajikistan and Yemen with 2.2, 2.7 and 3.4 points, respectively. In Europe, Finland was the country with the smallest rise (less than 2% absolute increase) followed by Iceland and Norway with a rise of about 4.5 points. In Latin America and the Caribbean, Costa Rica and Haiti had absolute increases of CS rates below4%. Across the world, Finland and Costa Rica were the countries with the smallest AARI in CS (0.4%) followed by Zambia (1%), Norway (1.6%) and Iceland (1.7%) [15]. Khawaja *et al.* 2009 carried out a brief review about hospital-based CS rates across and within countries in the Arab region. The review revealed great disparities in the hospital-based CS rates across and within countries in the Arab region. The discrepancies may illustrate the difference in approachability to maternal health services where the rates are low, or to the misapplication of medical technology in performing this surgical procedure in countries where the rates of CS at the hospital level are high[16]. During the past few decades, Egypt and Jordan showed increases in the CS rates which were not accompanied by consistent declines in the maternal mortality ratios. This may reflect the fact that women undergoing CS are not necessarily the ones who need them most. Additionally, high discrepancies were found among North African countries, with low rates in Algeria and Mauritania and high rates in Sudan and Egypt. The majority of the Gulf countries had CS rates below 15%, except for Bahrain and Qatar, with rates of about 16% each. As for the East Arab countries, the CS rates ranged from 14% in Gaza to 18% in Lebanon[16]. Within countries, CS rates varied with nonmedical risk factors such as age, education and rural–urban residence. Specially, women with secondary level of education, living in urban places and over 35 years of age were more likely to undergo CS deliveries than other women. The largest discrepancies in the CS rates were found by age and might be attributed to higher risks of complications as the age of the mother increases. Other contributing factors could be; maternal preferences, perceived potential for complications by medical doctors, as well as convenience of delivery may also be important determinants of CS delivery[16].

**Indications of cesarean section:**

The decision to perform a CS is grounded by knowing the best for the lives of the mother and her baby. The indications for cesarean section can therefore be divided into absolute and relative indications. Elective CS, performed solely at the wish of the mother, without any medical indication, is considered a separate indication[17]. There are different disciplines followed by different countries. In the German- speaking countries discussion of cesarean section depend mainly on the validity of the medical indications. These indications are divided into absolute and relative indications. Absolute indications are responsible for less than 10% of all deliveries by CS in Germany[17]. The Absolute indications include; absolute pelvic disproportion, amniotic infection syndrome, maternal pelvic deformity, eclampsia and other life- threatening complications of pregnancy, fetal asphyxia or fetal acidosis, umbilical cord prolapse, placenta Previa, abnormal lie and presentation and uterine rupture [17].

Most CSs are thus performed for relative indications. These indications include; Pathological Cardio-Toco-Graphy (CTG): – It may provide indication of acute hypoxia or fetal asphyxia. If fetal acidosis occurs, the birth should be completed by cesarean section, failure to progress in labor, delayed delivery or cessation of labor can result in an adverse outcome for the fetus or newborn, previous cesarean section: It is widely assumed that having had one cesarean section makes it impossible to have a vaginal delivery in subsequent pregnancies The decision is often made on the basis of a risk assessment, after extensive discussion with the midwives and physicians involved, together with the pregnant mother and her family [17]. Furthermore, there are recent indications for CS such as; Increased maternal age, age is not in itself an indication for CS; rather, it is the occurrence of specific risks in this age group that may lead to an indication for cesarean delivery. These risks include: risk of fetal congenital malformations, hypertension, or even diabetes mellitus [17]. Obesity and diabetes mellitus or gestational diabetes, if untreated can result in the birth of children with a birth weight of over 4000 g. Since the prevalence of obesity is globally continually rising, thus the probability is also increasing that women with diabetes are becoming pregnant, or that gestational diabetes will develop. Additionally, overweight and obesity are associated with other risks such as hypertension. Since fetal macrosomia is regarded as a relative indication, this factor could be affecting the cesarean rate [17]. There is a rise in assisted reproductive interventions, which increasingly are leading to multiple pregnancies lead to an increased cesarean rate[17]. Previous cesarean section does not necessarily mean a required cesarean delivery in subsequent pregnancies. But the sense of security of physicians and mothers seems to be responsible for repeated cesarean deliveries [17].

**Vaginal birth after cesarean section**

Trial of labor after cesarean delivery (TOLAC) refers to a planned attempt to deliver vaginally by a woman who has had a previous cesarean delivery, regardless of the outcome. This method provides women who desire a vaginal delivery the possibility of achieving the goal “a vaginal birth after cesarean delivery (VBAC).” It is one of the tools used to decrease or avoid the rising rate of cesarean delivery. Generally, good candidates for planned TOLAC are those women with low level of risk and are having high chances of success. It is

possible for women to have vaginal delivery even after a previous cesarean delivery. It has been shown that 55–67% of women, who had previously delivered through cesarean delivery, had successful vaginal delivery afterward [18, 19]. Primarily, the success of vaginal childbirth is dependent on different factors. High success rates have been attained when the amniotic fluid is free from meconium. In addition, vaginal birth should not be prioritized when a patient, who had given birth previously through cesarean delivery, has prolonged labor [18, 19]. Importantly, the status of the cervical regions are crucial in determining if a woman can give birth without necessary undergoing another cesarean section operation[18, 19].

**Factors affecting success rate of TOLAC**

A- Antepartum factors

Factors that are affecting success rate of TOLAC include; Indication for prior cesarean delivery, prior vaginal delivery, demographic factors, maternal medical disease, intrapartum factors, fetal macrosomia and type of hospital. [20-24]

- Indication of prior cesarean delivery: The rate of successful TOLAC by indication for prior cesarean delivery was higher when the fetal malpresentation was the indication compared with non-reassuring fetal heart rate pattern, and failure to progress.
- Prior vaginal delivery: Vaginal delivery before or after the cesarean delivery is the good sign for successful TOLAC.
- Demographic factors: Some ethnicity, e.g., Hispanic, African American, and Asian women are less likely to have a successful VBAC. Increasing maternal age, women with less education and high body mass index are also having a reduced likelihood of successful TOLAC
- Maternal medical disease: Such as hypertension, diabetes, asthma, renal disease, and heart disease have been reported to reduce the likelihood of successful TOLAC.

B- Intrapartum factors

- Admission labor status: Women in spontaneous labor or with a high bishop score are more likely to have successful TOLAC than women who are being induced or who have low Bishop Scores.
- Fetal macrosomia: A fetus weighing more than 4000 g reduces the likelihood of successful TOLAC.
- Type of hospital: Teaching hospitals or those affiliated with obstetrics and gynecology residency program have higher rates of TOLAC and successful VBAC. Women who deliver at a private or rural hospital have a decreased likelihood that TOLAC will be attempted, and if attempted, a decreased rate of successful VBAC when compared to a tertiary care or perinatal center.

**Potential benefits of VBAC**

The potential benefit at the individual level is the fulfillment of the patient's preference for vaginal delivery. VBAC is also associated with decreased maternal morbidity and the expected complications in future pregnancies as well as a decrease in the overall cesarean delivery rate at the population level [25, 26]. Compared to CS, women having a VBAC will have fulfillment of the patient's preference for vaginal delivery, shorter stays in hospital and recovery period. Furthermore, there will be avoidance of major abdominal surgery, lower rates of hemorrhage, infection and deep vein thrombosis. Additionally; there will be improvement of the mother-infant bonding, leading to the long term wellbeing of the infant and reduction of maternal morbidity [25, 26].

**Potential risks of VBAC and TOLAC**

VBAC is associated with fewer complications than elective repeat cesarean delivery, whereas a failed TOLAC is associated with more complications [25, 26].

**Maternal and perinatal complication of VBAC and ERCS:**

Maternal complications include; failure of the trial, mortality, uterine rupture, hypoxic ischemic encephalopathy, hemorrhage and transfusion. Other complications are; respiratory problems, peri-partum hysterectomy, infections and pelvic floor injury [25, 26].Neonatal outcomes after C/ S neonates born by intended cesarean delivery were more prone to NICU admission for hypoglycemia than neonates in the intended VBAC group. In addition, our results show that more neonates born by intended elective repeat cesarean delivery required higher rates of oxygen supplementation and ventilatory support in the NICU, compared with neonates born in the intended VBAC group. Respiratory morbidity in neonates born after elective repeat cesarean delivery, particularly with an increase in respiratory distress syndrome, transient tachypnea of the newborn, persistent pulmonary hypertension, and need for supplemental oxygen.

Kamath et al conducted a retrospective cohort study of 672 women with one prior cesarean delivery and a singleton pregnancy at or after 37 weeks of gestation. They found out that neonates born by CS had higher neonatal intensive care admission rates compared with the VBAC group and higher rates of oxygen supplementation for delivery room resuscitation and after NICU admission. Additionally, they had hypoglycemia than neonates in the intended VBAC group. Neonates delivered after failed VBAC required the greatest degree of delivery room resuscitation. [27]

Al-Shaikh et al conducted a prospective cohort study in Saudi Arabia – 2013. The study included all women who had lower segment caesarian section in any previous delivery and were admitted for a trial of labour after cesarean between April 2010 and March 2011. The investigators found out that the infants of mothers who had successful VBAC following spontaneous labour had significantly more frequent Apgar score above 7 at 5 min of birth. [28]

Studsgaard et al conducted a study in Danish university hospital among Women with TOLAC and women with ERCD-MR between 2003 and 2010. They reported that TOLAC was associated with an increased risk of neonatal depression and neonatal intensive care unit admission [29]

Ruofan et al (2017) analyzed a cohort of singleton non-anomalous births between 37 and 42 weeks gestational age retrospectively with maternal history of; obesity and of one or two previous cesarean deliveries. The neonatal outcomes included 5-minute Apgar score <7, prolonged assisted ventilation, neonatal intensive care unit admission, neonatal seizures, and neonatal death. [30]

Litwin et al in 2018, conducted a retrospective population-based cohort study using the CDC's Period Linked Birth/Infant Death Public Use File (2011–2013) on women with a live singleton pregnancy and prior Caesarean delivery. They found out that women who had a TOLAC were more likely to deliver infants requiring neonatal intensive care unit and assisted ventilation, seizures and death. [31]

In Benghazi, to my knowledge that there is no previous research concerned with studying the trial of vaginal deliveries after one previous CS and its neonatal outcome.

**AIMS**

- To describe the pattern of neonatal outcomes following a trial of vaginal deliveries after one previous cesarean delivery in Benghazi government owned hospitals.
- Comparing differences in neonatal outcomes among different modes of delivery after previous cesarean deliveries in the above described population.

## SUBJECTS AND METHODS

**Design:** cohort study.

**Inclusion criteria**

Mothers presented or referred for delivery in Benghazi governmental hospitals (Benghazi medical center and Jomhoria hospital) with previous cesarean section (para 1) would be included.

**Comparison groups**

Two primary cohorts:

- Cohort one: elective cesarean with history of previous cesarean delivery.
- Cohort two: patients presented in labor pain with history of previous cesarean delivery.

A secondary cohort of normal vaginal versus emergency cesarean delivery would be set as internal comparison secondary cohort.

**Sampling and course of study:** Assuming 15% occurrence of perinatal fetal events in the non exposed and 30% in the exposed; 95% confidence limit; power of 80%, and an expected odds ratio of 2, an optimal sample number for elective cesarean cohort was estimated to be 168 (after adjusting for non-participation rate of 20%) which expected to be attained on daily bases recruiting cases over three months period. Comparison cohort (TOLAC) would be set at error margin of 5% as if a one group study with similar characteristics internal comparison groups; the total number after adjusting for 20% non-participation is 335 which might be achieved over the same period.

**Variables to be studied**

- Basic demographic characteristics.
- Health background of the subject, either general, gynecological or obstetric as well as co morbidities.
- Order and Indication for previous cesarean section
- Vital signs of mother on admission
- Data of last delivery
- Data of current pregnancy
- Mode of delivery and indications for cesarean if done.
- Major maternal and neonatal outcomes data.

**Data collection and analysis**

Data would be collected as secondary data by review of patients' files in addition to some primary data gathered at time of admission if not provided in the file. A structured proforma is designed to inquire for all of variables of interest and to document them. Data would be entered on an excel sheet data base with nominal variables encoded, to be then transferred and analyzed on a file of statistical package for social science (SPSS) program version 20.0 (IBM). Analysis shall include descriptive of study parameters in terms of means or medians with standard deviations and limits or proportions. For comparison purposes, chi- square tests for difference would be calculated for different types of procedures using significant level if P≤ o.o5.

**Administrative Approval:**

The approval of Benghazi Medical Center head of gynecology & obstetric Department was taken before collection of data.

## RESULTS

During the study period, the total number of participants was two hundred ninety seven cases. The mean age ± standard deviation of participants was 31.64 ± 5.87 years. The youngest participant was 19 years and the eldest was 46 years. Table 1

**Table 1. Descriptive statistics of age of participants**

| Descriptive Statistics | Age in years (total 297) |
|---|---|
| Mean | 31.64 |
| Median | 31.00 |
| Mode | 30.0 |
| Std. Deviation | 5.87 |
| Minimum | 19.0 |
| Maximum | 46.0 |
| Missing | 9 |

Table 2 shows that the highest proportion of participants (67.7%) had one baby, followed by cases with two babies (12.5%).

**Table 2. Parity of participants**

| Parity | No | % |
|---|---|---|
| 1 | 201 | 67.7 |
| 2 | 37 | 12.5 |
| 3 | 21 | 7.1 |
| 4 | 16 | 5.4 |
| 5 | 13 | 4.4 |
| 6 | 4 | 1.3 |
| 7 | 1 | .3 |
| Total | 293 | 98.7 |
| Missing | 4 | 1.3 |
| Total | 297 | 100.0 |

Table 3 reveals that most of cases (96.6%) had blood pressure less than & equal to 130/85 mm hg and only 0.3 % of cases their blood pressure was equal to & more than 150 /100 mm hg.

**Table 3. Blood pressure of participants**

| Blood pressure categories | No | % |
|---|---|---|
| Less than & equal to 130/85 mm hg | 287 | 96.6 |
| 140/90 mm hg | 4 | 1.3 |
| Equal to & more than 150/100 mm hg | 1 | .3 |
| Total | 292 | 98.3 |
| Missing | 5 | 1.7 |
| Total | 297 | 100.0 |

Regarding, symptoms presented by the cases, all cases (100.0 %) complained of lower abdominal pain. Table 4

**Table 4. Lower abdominal pain of participants**

| Lower abdominal pain | No | % |
|---|---|---|
| Presence of lower abdominal pain | 297 | 100.0 |
| No lower abdominal pain | 0 | 0.0 |
| Total | 297 | 100.0 |

Figure1 shows that lower abdominal pain was the main complaint and it was accompanied by other complaints such as, clear liquor, meconium & bloody liquor. All cases (100.0 %) had lower abdominal pain, followed by cases with lower abdominal pain and bloody liquor (21.55%). Only, 1.68 % had lower abdominal pain and clear liquor.

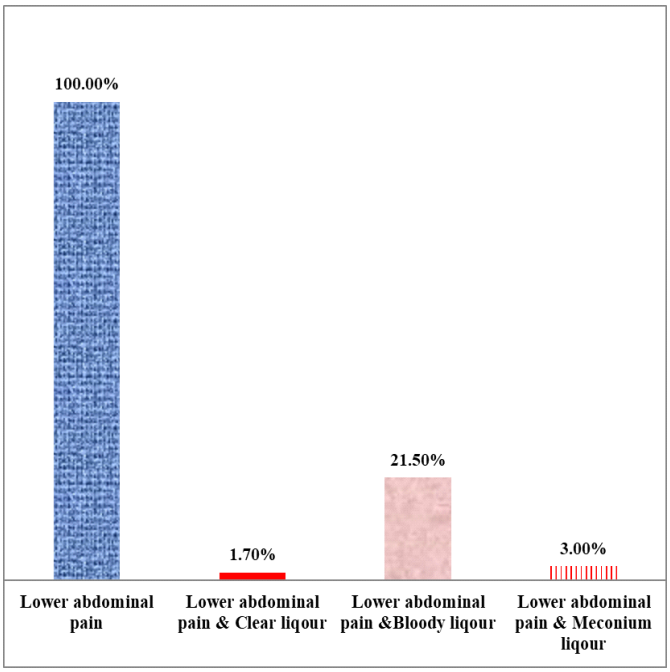


**Figure 1. Presenting symptoms of cases**

Table 5 shows that 50.8% of cases had spontaneous labour and 49.2% had induced labour.

**Table 5. Distribution of participants according to history of spontaneous labour**

| Spontaneous labour | No | % |
|---|---|---|
| Spontaneous labour | 151 | 50.8 |
| Induced labour | 146 | 49.2 |
| Total | 297 | 100.0 |

98.64 % of participants delivered by cesarean section, 1.02 % delivered vaginally and 0.34 % had hysterotomy.

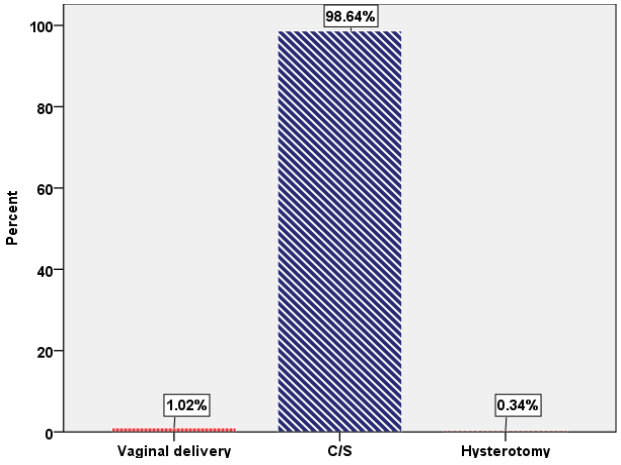


**Figure 2. Mode of last delivery of participants**

Figure 3 shows that 2.7 % of participants had anemia (hemoglobin level <9.0 g/dl); equal proportions (0.7%) had abnormal renal function tests; liver function tests and urine analysis. Cases that had hyperglycemia represented 1.7 %

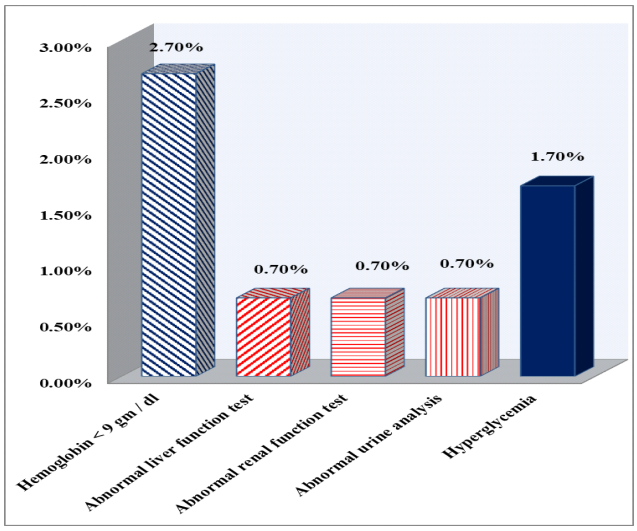


**Figure 3. Abnormal laboratory investigations of participants**

Figure 4 shows that the highest proportion of cases (37.3%) delivered by emergency cesarean, followed by vaginal delivery (34.3%) and the lowest proportion (27.9%) delivered by elective cesarean.

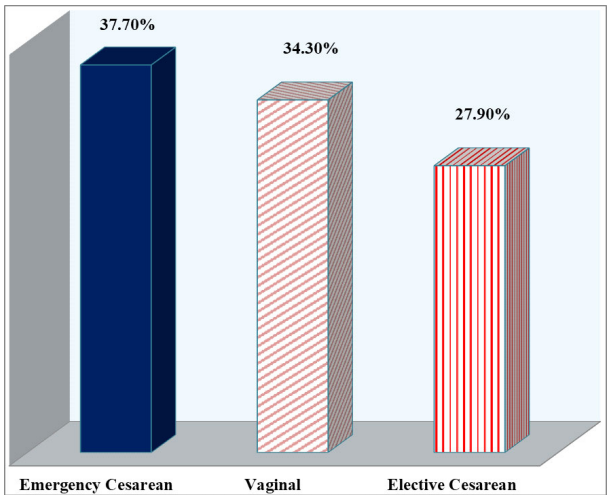


**Figure 4. Mode of delivery of participants**

Most of the cases (93 %) had reactive CTG, only 2 % had decelerated CTG and those who had CTG with decreased variability represented 5%. Figure 4

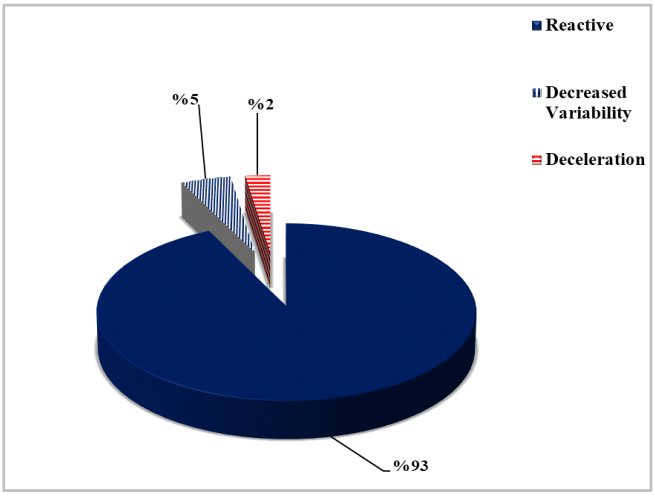


**Figure 5. CTG findings of participants**

Most of the babies (98.65 %) had good Apgar score, only 1.35 % had bad Apgar score. Figure 6

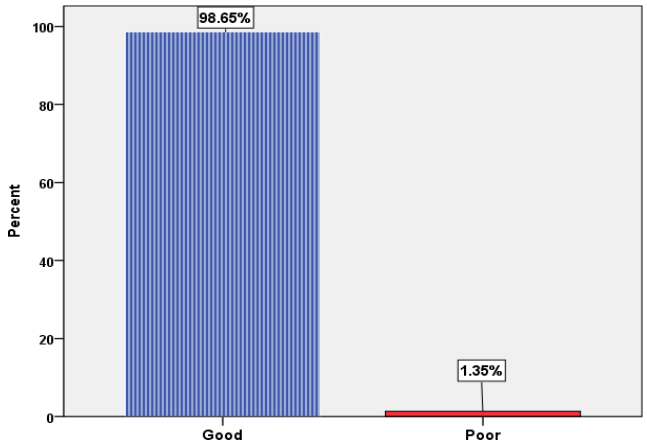


**Figure 6. Apgar scores of babies**

Table 6 shows that 1.4% of cases aged more than 31 years, their babies had poor Apgar score. Only, 1.3 % of cases aged 31 years &less had poor Apgar score.

This difference was not statistically significant. P = 0.660

**Table 6. Association between age category of cases and Apgar score of their babies**

| | | APGAR | | Total |
|---|---|---|---|---|
| | | Good | Poor | |
| Age more than 31 years | Count | 141 | 2 | 143 |
| | % within Age >31 years | 98.6% | 1.4% | 100.0% |
| Age 31 years & less | Count | 152 | 2 | 154 |
| | % within Age >31 years | 98.7% | 1.3% | 100.0% |
| Total | Count | 293 | 4 | 297 |
| | % within Age >31 years | 98.7% | 1.3% | 100.0% |

P value = 0.660

Table 7 revealed that there is minor difference between cases aged more than 31 years and those aged 31 years & less as regards bad neonatal outcome. This difference was not statistically significant.

**Table 7. Association between age category of cases and neonatal outcome**

| | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| Age more than 31 years | Count | 2 | 141 | 143 |
| | % within Age >31 years | 1.4% | 98.6% | 100.0% |
| Age31 years & less | Count | 2 | 152 | 154 |
| | % within Age >31 years | 1.3% | 98.7% | 100.0% |
| Total | Count | 4 | 293 | 297 |
| | % within Age >31 years | 1.3% | 98.7% | 100.0% |

Fisher's Exact Test, *P* =0.660

Table 8 shows that there is no statistically significant difference between Apgar score of cases with normal type of placenta and abnormal types of placentas; placenta Previa grade I, placenta Previa grade II, placenta Previa grade III and placenta Abruptio. P= 0.610

**Table 8. Association between type of placenta and Apgar score**

| | | APGAR | | Total |
|---|---|---|---|---|
| | | Good | Poor | |
| Normal placenta | Count | 275 | 4 | 279 |
| | % within New category of placentation | 98.6% | 1.4% | 100.0% |
| Abnormal placenta | Count | 18 | 0 | 18 |
| | % within New category of placentation | 100.0% | 0.0% | 100.0% |
| Total | Count | 293 | 4 | 297 |
| | % within New category of placentation | 98.7% | 1.3% | 100.0% |

Fisher's Exact Test *P*= 0.610

Table 9 shows that there is no significant statistical difference between cases with multiple pregnancies and those without regarding Apgar score, P= 0.680

**Table 9. Association between multiple pregnancy and Apgar score**

| | | | APGAR | | Total |
|---|---|---|---|---|---|
| | | | Good | Poor | |
| Multiple pregnancy | Yes | Count | 12 | 0 | 12 |
| | | % within Multiple pregnancy | 100.0% | 0.0% | 100.0% |
| | No | Count | 281 | 4 | 285 |
| | | % within Multiple pregnancy | 98.6% | 1.4% | 100.0% |
| Total | | Count | 293 | 4 | 297 |
| | | % within Multiple pregnancy | 98.7% | 1.3% | 100.0% |

P= 0.680

There was no significant difference between cases with multiple pregnancies and those without regarding the bad neonatal outcome of their babies. P= 0.680

**Table 10. Association between multiple pregnancies and any bad neonatal outcome**

| | | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| Multiple pregnancy | Yes | Count | 0 | 12 | 12 |
| | | % within Multiple pregnancy | 0.0% | 100.0% | 100.0% |
| | No | Count | 4 | 281 | 285 |
| | | % within Multiple pregnancy | 1.4% | 98.6% | 100.0% |
| Total | | Count | 4 | 293 | 297 |
| | | % within Multiple pregnancy | 1.3% | 98.7% | 100.0% |

Fisher's Exact Test *P* =0.680

A higher was no significant statistical difference between cases with premature rupture of membrane and those without regarding their Apgar score. P= 0. 477

**Table 11. Association between premature rupture of membrane and Apgar score**

| | | | APGAR | | Total |
|---|---|---|---|---|---|
| | | | Good | Poor | |
| PROM | Yes | Count | 33 | 0 | 33 |
| | | % within PROM | 100.0% | 0.0% | 100.0% |
| | No | Count | 260 | 4 | 264 |
| | | % within PROM | 98.5% | 1.5% | 100.0% |
| Total | | Count | 293 | 4 | 297 |
| | | % within PROM | 98.7% | 1.3% | 100.0% |

Fisher's Exact Test *P* = 0. 477

There was no statistically significant difference regarding premature rupture of membrane and any bad neonatal outcome. *P* = 0.477

**Table 12. Association between premature rupture of membrane and any bad neonatal outcome**

| | | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| PROM | Yes | Count | 0 | 33 | 33 |
| | | % within PROM | 0.0% | 100.0% | 100.0% |
| | No | Count | 4 | 260 | 264 |
| | | % within PROM | 1.5% | 98.5% | 100.0% |
| Total | | Count | 4 | 293 | 297 |
| | | % within PROM | 1.3% | 98.7% | 100.0% |

Fisher's Exact Test *P* = 0.477

Table 13 shows that, there was no significant difference between babies with meconium or bloody stain liquor and those without regarding their Apgar score. P= 0.655

**Table 13. Association between babies with meconium or bloody stain liquor and Apgar score**

| | | APGAR | | Total |
|---|---|---|---|---|
| | | Good | Poor | |
| Yes | Count | 14 | 0 | 14 |
| | % within Meconium or bloody | 100.0% | 0.0% | 100.0% |
| No | Count | 279 | 4 | 283 |
| | % within Meconium or bloody | 98.6% | 1.4% | 100.0% |
| Total | Count | 293 | 4 | 297 |
| | % within Meconium or bloody | 98.7% | 1.3% | 100.0% |

Fisher's Exact Test *P* = 0.655

There were no statistically significant differences between cases that had meconium or bloody stained liquor and those who had no meconium or bloody stained liquor regarding their bad neonatal outcome. P = 0.655, table 14

**Table 14. Association between babies with meconium or bloody stain liquor and any bad outcome**

| | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| Yes | Count | 0 | 14 | 14 |
| | % within Meconium or bloody | 0.0% | 100.0% | 100.0% |
| No | Count | 4 | 279 | 283 |
| | % within Meconium or bloody | 1.4% | 98.6% | 100.0% |
| Total | Count | 4 | 293 | 297 |
| | % within Meconium or bloody | 1.3% | 98.7% | 100.0% |

Fisher's Exact Test *P* = 0.655

Table 15 revealed that there was no significant statistical difference between abnormal CTG and Apgar score. P= 0.589

**Table 15. Association between Abnormal CTG and Apgar score**

| | | | APGAR | | Total |
|---|---|---|---|---|---|
| | | | Good | Poor | |
| CTG abnormal | Yes | Count | 20 | 0 | 20 |
| | | % within CTG abnormal | 100.0% | 0.0% | 100.0% |
| | No | Count | 273 | 4 | 277 |
| | | % within CTG abnormal | 98.6% | 1.4% | 100.0% |
| Total | | Count | 293 | 4 | 297 |
| | | % within CTG abnormal | 98.7% | 1.3% | 100.0% |

P=0.589

Table 16 shows that there was no significant statistical difference between abnormal CTG and Any bad neonatal outcome. P= 0.589

**Table 16. Association between Abnormal CTG and bad neonatal outcome**

| | | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| CTG abnormal | Yes | Count | 0 | 20 | 20 |
| | | % within CTG abnormal | 0.0% | 100.0% | 100.0% |
| | No | Count | 4 | 273 | 277 |
| | | % within CTG abnormal | 1.4% | 98.6% | 100.0% |
| Total | | Count | 4 | 293 | 297 |
| | | % within CTG abnormal | 1.3% | 98.7% | 100.0% |

P= 0.589

Table 17 shows that there was no significant statistical difference between abnormal amount of liquor and Apgar score. P=0.343

**Table 17. Association between Abnormal amount of liquor and Apgar score**

| Liquor abnormal | | APGAR | | Total |
|---|---|---|---|---|
| | | Good | Poor | |
| Yes | Count | 54 | 0 | 54 |
| | % within Liquor abnormal | 100.0% | 0.0% | 100.0% |
| No | Count | 239 | 4 | 243 |
| | % within Liquor abnormal | 98.4% | 1.6% | 100.0% |
| Total | Count | 293 | 4 | 297 |
| | % within Liquor abnormal | 98.7% | 1.3% | 100.0% |

P=0.343

Table 18 shows that there was no significant statistical difference between abnormal liquor amount and bad neonatal outcome. P= 0.343

**Table 18. Association between Abnormal CTG and bad neonatal outcome**

| Liquor abnormal | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| Yes | Count | 0 | 54 | 54 |
| | % within Liquor abnormal | 0.0% | 100.0% | 100.0% |
| No | Count | 4 | 239 | 243 |
| | % within Liquor abnormal | 1.6% | 98.4% | 100.0% |
| Total | Count | 4 | 293 | 297 |
| | % within Liquor abnormal | 1.3% | 98.7% | 100.0% |

P=0.343

Table 19 shows that there was statistically significant difference between vaginal mode of last delivery and Apgar score. P= 0.000

**Table 19. Association between mode of last delivery and Apgar score**

| Last delivery vaginal | | APGAR | | Total |
|---|---|---|---|---|
| | | Good | Poor | |
| Yes | Count | 2 | 1 | 3 |
| | % within Last delivery vaginal | 66.7% | 33.3% | 100.0% |
| No | Count | 291 | 3 | 294 |
| | % within Last delivery vaginal | 99.0% | 1.0% | 100.0% |
| Total | Count | 293 | 4 | 297 |
| | % within Last delivery vaginal | 98.7% | 1.3% | 100.0% |

P=0.000

Table 20 shows that there was significant statistical difference between mode of last delivery and bad neonatal outcome. P= 0.000

**Table 20. Association between mode of last delivery and bad neonatal outcome**

| Last delivery vaginal | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| Yes | Count | 1 | 2 | 3 |
| | % within Last delivery vaginal | 33.3% | 66.7% | 100.0% |
| No | Count | 3 | 291 | 294 |
| | % within Last delivery vaginal | 1.0% | 99.0% | 100.0% |
| Total | Count | 4 | 293 | 297 |
| | % within Last delivery vaginal | 1.3% | 98.7% | 100.0% |

P= 0.000

Table 21 shows that there was equal proportion of cases had poor Apgar score in both types of delivery. There was no significant statistical difference between modes of present delivery and Apgar score. P= 0.609

**Table 21. Association between mode of delivery and Apgar score**

| | | | APGAR | | Total |
|---|---|---|---|---|---|
| | | | Good | Poor | |
| Mode of Delivery | Yes | Count | 100 | 2 | 102 |
| | | % within Mode of Delivery | 98.0% | 2.0% | 100.0% |
| | No | Count | 193 | 2 | 195 |
| | | % within Mode of Delivery | 99.0% | 1.0% | 100.0% |
| Total | | Count | 293 | 4 | 297 |
| | | % within Mode of Delivery | 98.7% | 1.3% | 100.0% |

P= 0.609

Table 22 shows that there was no significant statistical difference between mode of present delivery and bad neonatal outcome. P= 0.609

**Table 22. Association between mode of delivery and bad neonatal outcome**

| | | | Any bad neonatal outcome | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| Mode of Delivery | Yes | Count | 2 | 100 | 102 |
| | | % within Mode of Delivery | 2.0% | 98.0% | 100.0% |
| | No | Count | 2 | 193 | 195 |
| | | % within Mode of Delivery | 1.0% | 99.0% | 100.0% |
| Total | | Count | 4 | 293 | 297 |
| | | % within Mode of Delivery | 1.3% | 98.7% | 100.0% |

P= 0.609

## DISCUSSION

The present study showed that most of the babies (98.65 %) had good Apgar score, only 1.35 % had bad Apgar score. Tilden *et al.* (2017) found out that a pattern of increased neonatal morbidity was noted among women with a history of cesarean delivered by VBAC. This study had higher morbidity rates due to larger study cohort also, a proportion of these cases delivered outside hospital care. [32] A slightly higher proportion of cases aged more than 31 years, their babies had poor Apgar score compared to those aged less than 31 years. There is association between increasing of maternal age and reduction in Apgar score. In the present study, there is no statistically significant difference between Apgar score of cases with normal type of placenta compared to abnormal types of placentas. From the present study, there was no significant difference between babies with meconium or bloody stain and those without regarding their Apgar score. Meconium-stained liquor affects fetal circulation and is associated with fetal hypoxia. Hence the total score of Apgar will decline and consequently, there will be bad neonatal outcome. The present study revealed that there was no significant statistical difference between abnormal liquor amount and bad neonatal outcome. Although, as the amount of liquor decreases it affects the general condition of the fetus. The study illustrated that there was significant statistical difference between modes of last delivery; cases with history of CS in the last delivery had poor Apgar score and bad neonatal outcome.

### Conclusion

The results of this study showed that cases of vaginal birth after C-section, must consider the individual's clinical condition. There was association between mode of delivery as vaginal with prolonged labour after previous CS and meconium excretion, and fetal distress. Thus, this may lead to preferring CS than vaginal delivery. Though, cesarean section is like any other surgery may cause many complications for the mother and the baby.

### Recommendations

- There should be attempts to reduce the percentage of elective C-section for the first delivery in order to reduce the increase trend of CS.
- Therefore, managers and planners should develop and implement appropriate strategies to reduce this method of delivery.
- The managers and planners should stress on application of evidence-based indications of CS.
- In service training for doctors to give time for counseling of women before pregnancy and during pregnancy and train them about painless delivery, labor preparation classes.
- Raising awareness of women about birth methods and their side effects
- Emphasis should be undertaken for improving facilities and safe equipment for vaginal delivery.

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