

RESEARCH ARTICLE

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An overview of cesarean sections in primigravid women at the Queen Elizabeth Hospital from 2022 to 2024

Keturah Murray, Kevin Harewood, Krista Toppin,
Tara Holder, NaTisha Robinson

ABSTRACT

Aims: This retrospective cohort study evaluated cesarean section (CS) rates and indications among primigravid women at the Queen Elizabeth Hospital (QEH) between August 2022 and August 2024. Singleton pregnancies beyond 28 weeks' gestation were included. Of 1273 primigravid patients, 348 underwent CS, giving a rate of 27.3%. The leading indications were fetal distress (32.6%), failed induction or augmentation of labor (21.3%), and eclampsia/preeclampsia (7.8%). Most CS procedures were emergencies (90.8%), while 9.2% were elective. Most patients were aged 21–29 years and had full-term pregnancies. Continued audits are recommended to evaluate indications and reduce unnecessary CS deliveries. The aims of this study were to determine the rate and indications for cesarean section (CS) deliveries among primigravid women and to analyze trends in the indications for cesarean sections performed at the QEH.

Methods: A retrospective cohort analysis of primigravida mothers who delivered via CS at the QEH between August 2022 and August 2024. The study population included singleton patients with neonates born at a gestation of greater than 28 weeks. All patient data was anonymized.

Results: There were a total of 1273 primigravid patients over the two year study period, of these 348 delivered via

CS, a rate of 27.3%. The most common indication for CS was fetal distress (32.6%), followed by failed induction/failed augmentation of labor (21.3%), and eclampsia/preeclampsia (7.8%). The majority of CS were emergency (90.8%), the remaining 9.2% elective. There was a very high number of patients who booked their pregnancy (99%). Most patients were in the 21–29-year age category (49.1%) and had full-term pregnancies (44.3%).

Conclusion: In our institution, CS rates in primigravida women are high. Further audits should be undertaken to continuously evaluate the indications for CS with an overall aim to reduce the rates.

Keywords: Caribbean, Cesarean section, Primigravida, Trends

How to cite this article

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Keturah Murray¹, Kevin Harewood¹, Krista Toppin¹, Tara Holder¹, NaTisha Robinson²

Affiliations: ¹MBBS, Senior House Officer, Department of Obstetrics and Gynecology, Queen Elizabeth Hospital, St. Michael, Barbados; ²MBBS, MRCOG, FRCOG, Consultant Obstetrician and Gynecologist, Maternal and Fetal Medicine Specialist, Department of Obstetrics and Gynecology, Queen Elizabeth Hospital, St. Michael, Barbados.

Corresponding Author: Dr. Keturah Murray, Queen Elizabeth Hospital, Martindales Road, St. Michael, Barbados; Email: Keturahmurray96@gmail.com

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INTRODUCTION

In a 2015 statement, the World Health Organization (WHO) projected an increase in cesarean section (CS) rates globally in both developed and developing countries [1]. Angolile et al. echoed this projection in their 2023 study reporting that the global CS rate has almost tripled from 7% in 1990 to 21% in 2023—significantly surpassing the projected rate of 10–15% [2]. According to the United Nations Children's Fund (UNICEF), the CS rate in Barbados is 21% [3]. Current data suggest a strong

association with the rapidly increasing rate of cesarean births on maternal request. This can be appreciated regionally in the neighboring island of Dominican Republic (DR). Dominican Republic is recognized globally as one of the five (5) countries where CS births exceed spontaneous vaginal deliveries (SVD). There, CS rates are as high as 4 in 10 of all births [4]. This trend becomes especially significant in developing countries because of the resulting burden on healthcare expenditure and fetal-maternal health. Few studies have focused on cesarean delivery (CD) trends among primigravid patients. With this context, we wished to observe whether these trends are present in Barbados' developing population. The objectives of this study were to determine the rate and indications of CS deliveries in the primigravid population and to determine causative factors based on the data trends for CS performed at QEH.

MATERIALS AND METHODS

This was a retrospective cohort study which analyzed data of primigravid mothers who gave birth at the QEH, Barbados between August 2022 and August 2024. The QEH is the island's only public tertiary care center. The research was conducted through the Department of Obstetrics and Gynaecology. For our analysis, the necessary data were collected from the QEH Labour Ward data books and tabulated. Only patients with singleton pregnancies who delivered after the age of viability (28 weeks gestation) were included. All patient data were anonymized and entered using Microsoft Excel for Microsoft 365 Microsoft Office (Version 2501). A total of 348 patients were included.

RESULTS

During the two-year study period, there were a total of 348 primigravid women who delivered via CS. The mean age of the study participants was 27.3 ± 6.5 years, ranging from 15 to 49 years. The majority of participants (49.1%) were within the 21–29-year age group, 17% were aged less than 20 years, 30.7% were aged 30–39 years, and 3.2% were aged over 40 years (Table 1). A total of 43 participants (12.4%) were advanced maternal age (35 years or older

Table 1: Patient demographics (age)

Age (years)	Number	Percentage
<20	59	17
21–29	171	49.1
30–39	107	30.7
(30–34)	(75)	(21.5)
(35–39)	(32)	(9.2)
>40	11	3.2
Total	348	100

at the time of pregnancy). Of the 348 participants, 347 (99.1%) booked their pregnancies (Table 2).

The most common indication for CS was fetal distress (32.6%), followed by failed induction/failed augmentation of labor (21.3%) and eclampsia/preeclampsia (7.8%). Unfortunately, the data for indication were not available for 16.3% of patients. Other indications included malpresentation (7.5%)—predominantly breech presentation, fetal tachycardia (1.4%) or bradycardia (4%) (Table 3). Ten babies (6.9%) were born on the extremes of the birth weight spectrum, (2.6%) extremely low birth weight, and (4.3%) macrosomic. The overwhelming majority of babies were normal birth weight (74%) (Table 4).

Term pregnancies accounted for the majority of births; 44.3% full term, 29% early term, and 9.2% late term while the total number of preterm deliveries was 61 (17.5%) (Table 5). There were only 32 elective CS (9.2%), with the remaining majority (315 CS) being emergencies (90.8%) (Table 6). The proportion of patients who underwent induction or augmentation of labor (53.3%)

Table 2: Patient demographics (booking status)

	Number	Percentage
Booked	344	99.1
Unbooked	4	0.9
Total	348	100

Table 3: Cesarean section indications

Indication	Number	Percentage
Cervical stenosis	1	0.3
Cord prolapse	4	1.2
Eclampsia/Preeclampsia	27	7.8
Failed instrumental delivery	2	0.6
Failure to progress	74	21.3
(a) Failed induction of labor	(30)	(8.6)
(b) Failed augmentation of labor	(44)	(12.7)
Fetal abdominal wall defect	2	0.6
Fetal distress	132	38
IUGR Abnormal umbilical artery Doppler	5	1.5
Macrosomia	1	0.3
Malpresentation	26	7.5
Placental abruption	5	1.4
Previous myomectomy	5	1.4
Placenta previa	5	1.4
Undocumented	57	16.4
Unknown viral load	1	0.3
Total	348	100

IGUR: intrauterine growth restriction.

was higher when compared to those who did not (40.6%), although data were missing for 21 participants (6.1%) (Table 7).

Table 4: Birth weights of infants

Birth weight (grams)	Number	Percentage
<1000 g (extremely low birth weight)	9	2.6
1000–1499 (very low birth weight)	10	2.9
1500–2499 (low birth weight)	56	16.1
2500–3999 (normal)	258	74.1
>4000 (macrosomia)	15	4.3
Total	348	100

Table 5: Demographic data (gestational age)

Gestation (weeks)	Number	Percentage
28–31+6 (very preterm)	18	5.2
32–33+6 (early preterm)	13	3.7
34–36+6 (late preterm)	30	8.6
37–38+6 (early term)	101	29
39–40+6 (full term)	154	44.3
41–41+6 (late term)	32	9.2
Total	348	100

Table 6: Cesarean section categories

	Number	Percentage
Emergency	315	90.8
Elective	32	9.2
Total	348	100

Table 7: Induction/augmentation status

Induced/augmented	Number	Percentage
Yes	184	53.3
No	140	40.6
Undocumented	21	6.1
Total	348	100

DISCUSSION

This study aimed to assess the prevalence and associated risk factors of CS deliveries among primigravidae who delivered at the QEH, the only public tertiary care center, in the island of Barbados, between the years 2022 and 2024.

Cesarean section deliveries are one of the most performed surgical procedures globally. It is associated with high morbidity and mortality as compared to vaginal delivery [5]. Compared with multiparous patients, primigravid mothers have a higher likelihood of cesarean delivery, with one study reporting rates to be 2.82 times greater [6]. However this was not in keeping with the results of our study. Over the two (2) year time period of this study, August 2022 to August 2024, there were a total of 4010 deliveries at the QEH. Of these, 1273 were primigravid patients. The percentage of CS delivery performed in primigravid patients was 27.3%, which was comparable to the rate in multiparous patients, approximately 27%, overall a combined average of 27.1% (Figure 1). These rates are still well above the 10% target set by the World Health Organization [7].

Our study highlighted varying indications for CS deliveries. Consistent with two (2) studies emerging from a country with a similar demographic population, non-reassuring fetal status was the most common indication for CS deliveries [8, 9]. Some authors debate that the introduction of non-stress testing in obstetrics has led to a rise in the number of CS deliveries performed [10]. Continuous electronic fetal monitoring was introduced to enable the early identification of fetal asphyxia with the hope of preventing death or long-term neurological morbidity; however, it is now seen as an important driver of the rising rate of CS deliveries [11]. The use of fetal scalp electrode monitoring should also be considered as an adjunct to routine fetal surveillance. When combined with electronic fetal monitoring, this complementary diagnostic tool may provide more accurate assessment of fetal well-being and support clinical decision-making regarding the need for cesarean section.

In low- and middle-income countries, instrumental vaginal delivery is becoming less utilized while CS delivery is becoming an increasingly common mode of delivery [12]. In our study, only two participants (0.6%) underwent CS delivery due to failed operative delivery. This warrants further discourse on whether operative vaginal delivery is being appropriately offered to eligible patients.

Failed induction of labor (IOL) is the inability to achieve active labor despite adequate attempts with induction methods such as oxytocin and/or amniotomy within a defined time frame [13]. This contributes to high

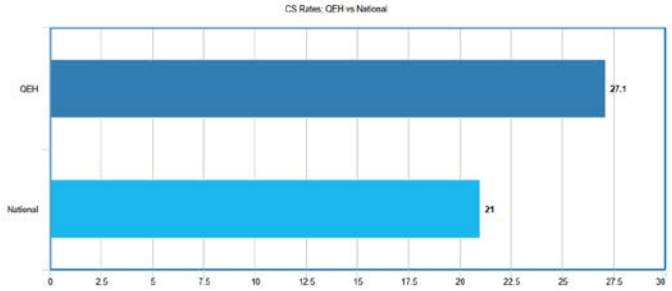


Figure 1: Bar chart comparison of CS rates.

cesarean section rates, posing risks to both maternal and neonatal health [13]. Based on our data, failed IOL accounted for 8.6% of CS deliveries. A retrospective cross-sectional study by Lonseko et al. found a similar prevalence of 21.2%, with a 95% confidence interval (CI) of 17–25%. Furthermore, their work highlighted that age over 30 years [adjusted odds ratio (AOR)=6.78, 95% CI: 3.13–14.70], being a primigravida [AOR=6.68, 95% CI: 3.10–14.40], a low Bishop score [AOR=3.90, 95% CI: 1.62–9.39], and premature rupture of membranes [AOR=3.27, 95% CI: 1.42–7.54] were associated with failed IOL. Some authors suggest limiting the use of IOL, by avoiding elective inductions, recognizing the association of CS delivery with cervical status and the importance of allowing the induction sufficient time to progress may result in lower CS rates [10]. A higher rate of labor induction among primigravidas may be attributed to the increased frequency of pregnancy-related complications and indications for induction in this group. Primigravid women have a higher risk of conditions such as post-term pregnancy, hypertensive disorders, and suspected fetal compromise, which may necessitate induction of labor. The majority of failed labor inductions occurred in the 21–29-year age group. However, this finding likely reflects the larger proportion of primigravid women within this age category in the study population rather than an age-specific increased risk for induction. It is known however that women of advanced maternal age may have additional age related obstetric risks. Although induction of labor is not always avoidable, we recommend rigorous evaluation of clinical indications is crucial to ensure judicious use, enhance the likelihood of successful vaginal birth, and reduce unnecessary cesarean section rates. Furthermore, evaluation of the methods used for cervical ripening—such as mechanical techniques (e.g., Foley catheter) compared with pharmacological agents (e.g., prostaglandins)—may be warranted to optimize induction outcome.

From our study, the majority of CS deliveries were performed as emergency procedures (90.8%). This is in keeping with rates of 89.3% found by Ashiko et al. [6]. Of the approximately 10% of the elective CS, the predominant indication was malpresentation (breech), accounting for 7.5%, other indications included previous myomectomy and placenta previa. These findings highlight the need to evaluate whether management of term breech presentations is being optimized, particularly regarding the use of external cephalic version. With a reported mean success rate of approximately 60%, this intervention is both cost-effective and has the potential to significantly reduce cesarean delivery rates. The Canadian Term Breech Trial, a large multicenter randomized controlled study done in 2000, showed that perinatal mortality, neonatal mortality, or serious neonatal morbidity was significantly lower for patients who underwent planned CS delivery when compared to planned vaginal birth [14]. This monumental study likely contributed to a shift in clinical practice, resulting in higher rates on the global scale.

Poma noted that both low-birth-weight and high-birth-weight neonates have comparable CS rates, which exceed those seen in infants weighing 2501–4000 g [15]. In our study, however, most neonates (74.1%) were born within the normal weight category (2500–4000 g), 4.3% being macrosomic and the remainder low birth weight (21%). Full-term pregnancies, 39–40⁺ weeks, represented the majority of participants in this study. Studies have not yet demonstrated a clear correlation between gestational age at delivery and CS rates.

Taye et al. found that mothers between the ages of 35–39 were 5.3 times more likely to undergo CS than those with age groups of 20–24 [7]. In this cohort, it was observed that CS rates were highest in the 21 to 29 age group (49.1%) followed by the 30–39 age groups (30.7%).

Our study reported very high rates of antenatal booking (99.1%). The National Institute for Health and Care Excellence (NICE) recommends that the first booking appointment takes place by 10+0 weeks of pregnancy [16]. Limitations to early antenatal care include low educational status of the woman or her partner, high community level poverty and low literacy rates [17].

This study provides locally relevant data by examining CS rates specifically among primigravid women at the QEH, a population for which limited regional data exist. By restricting the cohort to primigravidas, the study minimizes confounding from previous obstetric history, allowing for clearer interpretation of risk factors and outcomes.

A limitation of this study was the lack of clear and consistent documentation of the indications for CS, which restricted the ability to accurately classify or compare clinical decision-making across cases. This may have limited deeper analysis of whether specific indications were appropriately applied or varied between providers.

CONCLUSION

The prevalence of cesarean delivery in primigravid patients was found to be high. There is a need to continue to conduct cesarean delivery audits to appropriately utilize scarce resources.

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Author Contributions

Keturah Murray – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation

of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Kevin Harewood – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Krista Toppin – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Tara Holder – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

NaTisha Robinson – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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ABOUT THE AUTHORS

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Keturah Murray earned her undergraduate degree Bachelor of Medicine, Bachelor of Surgery (MBBS) from the University of the West Indies, Cave Hill Campus, Barbados. She has a keen interest in Obstetrics and Gynaecology and has published many articles in this field. Her research interests include adolescent gynaecology.

Email: keturahmurray96@gmail.com



Kevin Harewood is a Senior House Officer in Internal Medicine at the Queen Elizabeth Hospital, Barbados. He earned his Bachelor of Medicine and Bachelor of Surgery (MBBS) from the University of the West Indies, Cave Hill Campus, and is currently pursuing postgraduate studies in Internal Medicine. His professional interests include evidence-based clinical practice and medical education. He is particularly passionate about advancing high-quality clinical research across the Caribbean region.

Email: kev.harewood@gmail.com



Krista Toppin earned her Bachelor of Medicine and Bachelor of Surgery (MBBS) from the University of the West Indies, Cave Hill Campus, Barbados in 2024 and completed her medical internship at the Queen Elizabeth Hospital in 2025. She is a registered medical doctor with a keen interest in Obstetrics and Gynaecology. Her professional interests include maternal-fetal medicine, high-risk obstetrics, and gynecologic oncology. She looks forward to further developing her research skills by participating in collaborative research studies and publishing her own work in the future, with the aim of contributing to advancements in women's health.

Email: krjtoppin@gmail.com



Tara Holder is a general practitioner who earned her medical degree from the University of the West Indies in 2024 and successfully completed her medical internship in 2025. She has contributed to a few research projects and looks forward to expanding her involvement in research, with the goal of publishing her work in the future. She aspires to pursue a career in Obstetrics and Gynecology while also nurturing a newly discovered interest in Forensic Pathology.

Email: tara.holder01@gmail.com



NaTisha Robinson is a Consultant Obstetrician and Gynaecologist, Maternal and Fetal Medicine Specialist at the Queen Elizabeth Hospital, Barbados. She earned the undergraduate degree Bachelor of Medicine, Bachelor of Surgery (MBBS) from the University of the West Indies, Cave Hill Campus in 2001. Dr. Robinson attained Membership with the Royal College of Obstetricians and Gynaecologists in 2008, and completed her fellowship in Maternal and Fetal Medicine at Mount Sinai Hospital through the University of Toronto in 2013.

Email: nsrob75@hotmail.com

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