ISSN: 1607-8322, e-ISSN: 2220-5799 **Anaesthesia, Pain & Intensive Care**
Vol 29(7); October 2025 DOI: 10.35975/apic.v29i7.2959

ORIGINAL RESEARCH **OBSTETRIC ANESTHESIA**

Incidence and associated risk factors of breech deliveries in Duhok Obstetrics & Gynecology Teaching Hospital

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ABSTRACT

Background & Objectives: Breech presentation occurs when the fetal buttocks or feet are the presenting parts during labor. It can occur as frank (hips flexed, knees extended), complete breech (hips and knees flexed), or incomplete (not fully flexed hip; one-sided or both-sided). Most of the breech fetuses are frank breech. The increased incidence of breech presentations is associated with lower gestational ages, from 3% to 4% at term, to 28% at 25–28 weeks of gestation. This study aimed to determine the incidence rate of breech deliveries in Duhok Obstetrics and Gynecology Teaching Hospital and to identify the risk factors associated with breech presentation.

Methodology: This prospective observational (cross-sectional) study was conducted over 12 months (January 01, 2023, to January 01, 2024) at Duhok Obstetrics and Gynecology Teaching Hospital. The study included 452 breech cases and 452 cephalic presentations among 15,446 deliveries presented to the hospital. Women with a gestational age ≥32 weeks were included. Demographic, clinical, and obstetric characteristics, including risk factors, were collected through physical examination, ultrasound, and a structured questionnaire. Comparative analyses between the breech and cephalic groups were performed using Chi-square and t-tests, with $P < 0.05$ considered statistically significant.

Results: The participants in the present study mostly belonged to the 16–30-year age group**.** The incidence of breech deliveries was 2.93% (452/15,446). Breech presentation was significantly associated with prematurity (11.28%), premature rupture of membranes (PROM) (10.18%), and multiple pregnancies (5.97%). Less frequent risk factors included smoking 6 (1.33%), fibroids 3 (0.66%), intrauterine growth restriction (IUGR) 3 (0.66%), and preterm premature rupture of membranes (PPROM) 3 (0.66%).

Conclusion: Breech deliveries accounted for 2.93% of the total delivery cases and were significantly correlated with prematurity, PROM, and multiple pregnancies. Effective antenatal care and timely obstetric management are imperative for optimizing outcomes in patients with breech presentations.

Abbreviations: ANC: antenatal care, C/S: cesarean section, IUGR: intrauterine growth restriction, LMP: last menstrual period, PPROM: preterm premature rupture of membranes, PROM: premature rupture of membranes, VD: vaginal delivery.

Keywords: Antenatal care; Breech presentation; Gestational age; IUGR; Incidence rate; Multiple pregnancies; Prematurity; PROM; PPROM

Citation: Ibrahim BK, Ahmed AA. Incidence rate and associated risk factors of breech deliveries in Duhok Obstetrics & Gynecology Teaching Hospital. Anaesth. pain intensive care 2025;29(7):727-733.

DOI: 10.35975/apic.v29i7.2959

Received: July 15, 2025; **Revised:** August 06, 2025; **Accepted:** August 10, 2025

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1. INTRODUCTION

Fetal presentation is said to be constituted by the anatomic part of the fetus lying closest to the maternal pelvic inlet, the cephalic presentation being, obviously, the most felicitous, presenting the least risk to both the mother and the newborn. Therefore, breech presentation occurs when the buttocks or feet of the fetus enter the pelvic outlet first and may be classified into frank (fetal hips are flexed and knees are extended), complete (both hips and knees are flexed), and incomplete or footling (where one or both feet come first), with frank breech presenting the most common and rare footlings.[1] The best mode of delivery in preterm breech fetuses remains hotly debated, particularly since the incidence of breech presentation is inversely related to gestational age, ranging from 3% to 4% at term to as high as 28% between 25 and 28 weeks of gestation.[2] These cases pose a nightmare for clinicians as infants are already compromised and at risk of premature birth, and adding to this risk of an indelibly enhanced incidence of complications due to vaginal breech delivery-asphyxia, birth trauma, and head entrapment-even death worsens the outcome.[3,4] In addition, cesarean section (CS) for cesarean delivery for breech in preterm cases is technically demanding because of the undeveloped lower uterine segment and is associated with considerable short- and long-term maternal risks.[5] As gestational age advances, the chances of breech presentation at delivery diminish; about 20% of pregnancies are breech at 28 weeks, while fewer than 4% of singleton fetuses are breech at term.[6] This can be mainly attributed to the influence of diminished rotation or diminished fetal mobility, since the chance of spontaneous version decreases with gestation, making the common place of encounter of breech presentation preterm labor.[7,8]

A multitude of maternal, fetal, and uteroplacental risk factors have been linked with breech presentation. Maternal factors include multiparity (due to lax abdominal wall), a previous history of breech, primiparity, hypothyroidism, preterm birth, gestational diabetes, smoking, and extreme maternal age. Fetal factors include female sex, multiple gestations, fetal neurologic anomalies (such as anencephaly or hydrocephaly), macrosomia, fetal growth restriction, and asphyxia, whereas utero-placental factors consist of polyhydramnios, oligohydramnios, uterine anomalies (e.g., bicornuate or unicornuate uterus), uterine fibroids, and placenta previa.[1,9]

Preterm labor is a common cause of breech presentation, and while vaginal breech delivery at term is associated with poorer perinatal outcomes than cephalic vaginal delivery, it is debatable whether breech presentation itself is an independent risk factor for adverse outcomes.[10,11] Current guidelines suggest that the mode of delivery be selected according to the clinical scenario, patient preference, and experience of the healthcare team, whether it is an external cephalic version, vaginal breech delivery, or CS.[12,13] Although planned cesarean delivery could decrease perinatal death and short-term neonatal morbidity in breech presentation, it has not been shown to significantly decrease long-term morbidity for either mother or infant; however, it may also be associated with reductions in short-term maternal morbidity, such as thromboembolic complications and urinary incontinence.[11] This study aimed to determine the incidence rate of breech deliveries in Duhok Obstetrics and Gynecology Teaching Hospital and to identify the risk factors associated with breech presentation.

2. METHODOLOGY

This study was conducted at Duhok Obstetrics and Gynecology Teaching Hospital, a tertiary care center, over 12 months (from January 1, 2023, to January 1st, 2024). All deliveries during this period were evaluated, resulting in 15,446 deliveries. Of the total number of deliveries, 452 cases with breech presentation were identified. A total of 452 women with cephalic presentation were randomly selected as the control group. Women with gestational age <32 weeks or presentations other than breech or cephalic were excluded. Data collection involved identifying cases of breech presentation using physical examinations and ultrasound assessments. Ultrasound was used to confirm fetal presentation and measure gestational age. Information about prematurity, premature rupture of membranes (PROM), preterm PROM (PPROM), multiple pregnancies, oligohydramnios, intrauterine growth restriction (IUGR), and uterine anomalies or surgeries was obtained from clinical records and patient interviews.

Demographic and clinical data, including maternal age, body mass index (BMI), gravidity, parity, and antenatal care (ANC) attendance, were obtained using a standardized questionnaire designed specifically for this study. The gestational week was determined based on the last menstrual period (LMP) and ultrasound measurements during the first trimester when available. Fetal data, including sex and weight at birth, were also documented. The modes of delivery, spontaneous vaginal delivery, elective CS, and emergency CS were noted for each case. Verbal consent was obtained from all participants prior to their inclusion in the study, ensuring ethical compliance. Statistical analysis included the calculation of the incidence rate of breech deliveries as a proportion of the total deliveries.

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Table 1: Incidence rate of breech deliveries at Duhok Obstetrics & Gynecology Teaching Hospital

Incidence of PPROM	N (%)
Breech deliveries per year	452 (2.93)
• Multiparous	344 (76.11)
• Primiparous	108 (23.89)
Normal Deliveries	14994 (97.07)
Total Deliveries	15446 (100)

Table 2: Risk Factors of women with breech deliveries

Risk Factor	N (%)
Prematurity	51 (11.28)
PROM	46 (10.18)
Oligohydramnios	28 (6.19)
multiple pregnancy	27 (5.97)
history of previous breech delivery	21 (4.65)
Smoking	6 (1.33)
Fibroid	3 (0.66)
IUGR	3 (0.66)
PPROM	3 (0.66)
No	264 (58.41)

Comparative analyses between breech and cephalic presentations were performed using chi-squared tests for categorical variables and independent t-tests for continuous variables. Statistical significance was set at $P < 0.05$. This methodology established a robust framework for identifying breech deliveries and their associated risk factors, allowing for a comprehensive analysis of the clinical, demographic, and obstetric characteristics of women delivered at the Duhok Obstetrics and Gynecology Teaching Hospital.

Ethical approval was obtained from the Research Protocol Ethics Committee (license number: 208) on 22/1/2023. Informed consent was obtained from all participants or their legal guardians (minors). All patient data were anonymized to maintain confidentiality and privacy.

2.1. Statistical Analysis

Data were collected and analyzed using SPSS version 25. Categorical variables were compared using the chi-square test, and continuous variables were analyzed using independent sample t-tests. The descriptive purpose of this study was to evaluate the incidence rate and associated risk factors of breech deliveries in terms of frequency and percentages for numerical data, and in terms of means and standard deviations for categorical data. Statistical significance was set at $P \leq 0.05$.

3. RESULTS

Table 1 displays the annual incidence of breech deliveries at the Duhok Obstetrics and Gynecology Teaching Hospital. Of the 15,446 deliveries, 452 (2.93%) were breech. They included cephalic presentations delivered vaginally and by CS, but they also included others, such as transverse lie, preterm deliveries, and complications (intrauterine fetal demise, placenta accreta, and compound presentations).

The participants in the present study mostly belonged to the 16–30-year age group, constituting 18.58% of the 16–20-year-olds, 25.66% of the 21–25-year-olds, and 23.45% of the 26–30-year-olds. Women aged 31–35 years constituted 18.45%, while those aged 36–40 years constituted 11.86%. Only 1.99% of the participants were older than 40 years. The mean age was 28.12 ± 5.74 years. Regarding BMI, 45.13% had a normal weight (18.5-24.9 kg/m^2), 52.21% were overweight (BMI 25.0-29.9 kg/m^2), and 2.65% were obese (BMI ≥30.0 kg/m^2).

Table 1 also depicts the course of pregnancy and the characteristics of delivery in breech delivery patients. Participants (76.11%) were multiparous, meaning they had previous pregnancies, while 23.89% were primiparous, that is, those who had their initial pregnancies.

Table 2 presents the risk factors associated with breech deliveries. Prematurity was the most frequent factor (51 cases, 11.28%), followed by premature rupture of membranes (PROM) (46 cases, 10.18%). No single breech delivery occurred in an otherwise uncomplicated full-term pregnancy. Thus, these data indicate that every breech presentation in this study was inherently linked to some underlying obstetric risk, chiefly that of preterm labor and PROM. Oligohydramnios and multiple pregnancies were observed in 28 (6.19%) and 27 (5.97%) patients, respectively. A history of breech delivery was noted in 21 cases (4.65%). Less frequent risk factors included smoking 6 (1.33%), fibroids 3 (0.66%), intrauterine growth restriction (IUGR) 3 (0.66%), and preterm premature rupture of membranes (PPROM) 3 (0.66%).

Table 3 highlights the modes of delivery among women with breech presentations. Among women with breech deliveries, emergency C/S was the most common mode of delivery, accounting for 242 cases (53.54%). Spontaneous vaginal delivery (VD) occurred in 156

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Table 3: Mode of deliveries of women with breech deliveries

Mode of Delivery	N (%)
Elective C/S	54 (11.95)
Emergency C/S	242 (53.54)
Spontaneous VD	156 (34.51)
Total	452 (100)

Table 4: Fetal characteristics of women with breech deliveries

Fetal Sex	N (%)
Female	238 (52.65)
Male	184 (40.71)
Twin female	15 (3.32)
Female and male	12 (2.65)
Twin male	3 (0.66)
Total	452 (100)
Fetal weight (Kg)	3.22 ± 0.65

(34.51%) cases, while elective C/S was reported in 54 (11.95%) cases. Table 4 provides a brief description of the fetal characteristics of the breech deliveries. Twin pregnancies were quite rare, with 15 (3.32%) twin females, 12 (2.65%) twin females and males, and 3 (0.66%) twin males. The average fetal weight was 3.22 ± 0.65 kg.

Table 5 shows the distribution of the most significant obstetric risk factors for breech (case group) and cephalus (control group). Risk factors were significantly more common in the case of breech presentation, so only 58.41% of the cases had no discernible risk factors compared with 84.73% in the control group. The most common risk factors for breech presentation were prematurity (11.28%), PROM (10.18%), oligohydramnios (6.19%), and multiple pregnancy (5.97%). All of these were present in significantly more breech cases than in the controls, emphasizing their risk role in malpresentation. There was always an almost exclusive absence in the breech group. On the other hand, interestingly, PPROM was more common in the cephalic group (3.32%) than in breech (0.66%), possibly reflecting a difference in gestational timing or management.

Table 5: Risk factors associated with breech and cephalic presentations

Risk Factor	Breech Cases (n = 452)	Cephalic Controls (n = 452)	P-value
Uterine fibroid	3 (0.66)	0 (0.00)	0.2474
History of previous breech delivery	21 (4.65)	3 (0.66)	0.0004
Intrauterine growth restriction (IUGR)	3 (0.66)	0 (0.00)	0.2474
Multiple pregnancy	27 (5.97)	0 (0.00)	<0.0001
Oligohydramnios	28 (6.19)	12 (2.65)	0.0153
Preterm premature rupture of membranes (PPROM)	3 (0.66)	15 (3.32)	0.0041
Prematurity	51 (11.28)	24 (5.31)	0.0003
Premature rupture of membranes (PROM)	46 (10.18)	15 (3.32)	0.0001
Smoking	6 (1.33)	0 (0.00)	0.0300
No risk factors	264 (58.41)	383 (84.73)	<0.0001

4. DISCUSSION

The incidence of breech deliveries worldwide stands at 2-3%. In the last few decades, the CS rate has witnessed a mushrooming growth, followed by an increase in the rate of breech presentations maturing into cesarean deliveries. Such a trend has caused a fading in the knowledge and skills for vaginal breech delivery, with CS at times being the only option available.[13-15] In this study, we investigated the frequency, demographics, and risk factors of breech delivery at the Duhok Obstetrics and Gynecology Teaching Hospital. The incidence rate found in this study for breech deliveries was 2.93%, fairly close to what global reports indicate that the rate of breech delivery occurs in approximately 3–4% of term pregnancies.[16,17] This means consistency in emphasizing that breech presentations are rare, but carry clinical importance in obstetric practice. Similar rates have been reported in Iran (2.7%), Germany (3.1%), and Canada (2.6%), confirming the broader global spectrum.[18-20] Since most of the patients in the breech group were multiparous and not primiparous, with multiparity ranking fairly high in the breech group (76.11%) than in the cephalic presentation group (64.16%; P = 0.021), the findings of Cammu et al. (2014)[13] were confirmed, indicating multiparity as a risk factor for abnormal

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presentation. However, other studies have shown that primiparity may be a risk factor due to untested uterine tone and maladaptive biomechanics.[16,21] The reason for such contradictions may be the differing parity profiles of the sampled populations across different health systems. Prematurity (11.28%) and premature rupture of membranes (PROM, 10.18%) were the two main risk factors for breech deliveries because their prevalence decreased with increasing gestational age. This agrees with the findings of many studies reporting an enhancement in the likelihood of breech presentations in preterm deliveries because of incomplete fetal rotation.[14,15,17,26] Likewise, nationwide registries also support the fact that the highest odds of breech presentation were among preterm babies.[7]

Several other factors worth mentioning were multiple pregnancies (5.97%) and oligohydramnios (6.19%), conforming with the literature in explaining that uterine constraints lead to abnormal fetal positioning.[8,15] Studies confirm that multiple fetuses or diminished levels of amniotic fluid provide less mobility for cephalic placement.[24,29] Emergency CS (53.54%) was the predominant mode of delivery among the breech cases, followed by spontaneous vaginal delivery (34.51%). This finding agrees with studies favoring cesarean delivery for breech presentations, citing better neonatal outcomes (11,14). However, opposing studies have argued for reviving the consideration of planned vaginal breech delivery under strict criteria and experienced guidance.[8,10,24] In fact, upright vaginal breech delivery has been shown to have successful outcomes in Europe.[24]

Interestingly, our study found a higher incidence of PPROM in the cephalic group (3.32%) than in the breech group (0.66%). This paradox may be explained by the timing of the PPROM diagnosis and subsequent management decisions, which may encourage cephalic engagement in some circumstances. Similar trends were observed in a comprehensive perinatal outcome analysis.[23]

Regarding fetal traits, female breech deliveries were predominant (52.65%), which resonated with studies stating the increased likelihood of female fetal breech presentations.[25] Our study's mean fetal weight of 3.22 ± 0.65 kg is somewhat more than the means reported in other cohorts accentuated in breech,[7] which could be because more term and late preterm births were included. The distribution of risk factors among breech and cephalic presentations further strengthens the argument that breech presentation is rarely idiopathic. Significant associations were noted for prematurity, PROM, multiple pregnancies, and history of breech delivery ($P < 0.05$), consistent with several predictive studies.[13,26,27] While smoking and fibroids showed a low prevalence, the statistical correlations to breech incidence in our cohort remained conspicuous. However, other authors have argued that the impact of smoking may not be significant when considering other confounding factors.[28] Moreover, in our study, a previous history of breech delivery was marked as statistically significant ($P = 0.0004$), consistent with reports relating to recurrences of anatomical or genetic predispositions for breech.[16,29] Although rare, fibroids and IUGR were more prevalent in the breech group than in the cephalic group, much in the manner of ultrasound-based fetal presentation evaluations.[30]

In conclusion, this study provides valuable local data that complements the growing global body of literature on breech presentations. The high percentage of emergency cesarean deliveries highlights the need for vigilant antenatal surveillance, prompt diagnosis of risk factors, and reconsideration of institutional policies regarding vaginal breech delivery.

5. CONCLUSION

Breech deliveries accounted for 2.93% of the total delivery cases and were significantly correlated with prematurity, PROM, and multiple pregnancies. Routine third-trimester ultrasound screening and early identification of risk factors such as prematurity, PROM, and multiple gestation are recommended to improve decision making and reduce complications in breech deliveries.

6. Data availability

The numerical data generated in the course of this study are available from the authors.

7. Conflict of interest

All authors declare that there was no conflict of interest.

8. Funding

No external or industry funding was involved in this study.

9. Authors' contribution

BKI: Conceptualization, Methodology, Formal Analysis, Writing

AAA: Validation, Investigation, Data Curation, Software, Resources, Visualization, Project Administration

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