

## A Clinical Study on the Impact of Uterine Leiomyomas on Maternal and Fetal Outcomes During Pregnancy

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### Abstract:

**Background:** Uterine fibroids, or leiomyomas, are the most common benign tumors of the female reproductive tract, often encountered during the reproductive years. Their incidence in pregnancy is increasing due to delayed childbearing and widespread use of antenatal ultrasonography. Although many fibroids remain asymptomatic, their presence during pregnancy may lead to various obstetric complications such as miscarriage, preterm labor, malpresentation, placental abruption, and increased cesarean delivery rates. The impact of fibroids depends on their size, location, number, and growth during gestation. This study was conducted to evaluate the clinical implications of uterine fibroids during pregnancy and to assess their effect on maternal and fetal outcomes.

**Methods:** This prospective observational study was in the Department of Obstetrics and Gynaecology, Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India from May 2024 to December 2024. A total of 110 pregnant women with ultrasonographically diagnosed uterine fibroids were enrolled. Detailed obstetric history, fibroid characteristics (number, type, size, and location), and clinical course during pregnancy were documented. Maternal outcomes such as pain, threatened abortion, antepartum hemorrhage, mode of delivery, and postpartum hemorrhage were noted. Perinatal outcomes including gestational age at delivery, birth weight, Apgar score, and NICU admission were also recorded and analyzed.

**Results:** Among the 110 pregnant women with fibroids, 36.4% had a single fibroid while 63.6% had multiple fibroids. The most common type was intramural (44.5%), followed by subserosal (32.7%) and submucosal (22.8%). The average fibroid size was  $4.6 \pm 1.2$  cm. Common maternal complications included pain abdomen (38.2%), threatened miscarriage (21.8%), preterm labor (27.3%), and cesarean delivery (52.7%). Antepartum hemorrhage and postpartum hemorrhage were noted in 10.9% and 14.5% respectively. Regarding perinatal outcomes, 30.9% of babies were low birth weight, 26.4% were preterm, and NICU admission was required in 21.8% of cases.

**Conclusion:** The presence of uterine fibroids during pregnancy is associated with an increased risk of both maternal and fetal complications. Intramural and submucosal fibroids, in particular, significantly affect pregnancy progression and delivery outcomes. Early diagnosis and vigilant antenatal surveillance are essential to minimize adverse events and plan delivery in well-equipped facilities. Fibroid characteristics, especially number, type, and size, should guide risk stratification and individualized obstetric management.

**Keywords:** Uterine Fibroids, Leiomyoma, Pregnancy Complications, Maternal Outcome, Perinatal Outcome, Cesarean Delivery, Low Birth Weight, Preterm Labor.

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### Introduction

Uterine fibroids, also referred to as leiomyomas or myomas, are the most commonly occurring benign smooth muscle tumors of the uterus, affecting a significant proportion of women during their reproductive years. Their prevalence in the general female population ranges from 20% to 40%, with increased detection in recent years due to the widespread use of routine pelvic ultrasonography and advanced imaging techniques during antenatal care [1]. The association between fibroids and

pregnancy has gained considerable clinical importance, particularly in the context of delayed childbearing and the rising incidence of infertility management, which has led to more women conceiving at later reproductive ages when fibroid prevalence is higher [2].

Although many fibroids are asymptomatic and may not interfere with pregnancy, their presence can alter the physiological adaptations of gestation depending

on their size, location, and number. Fibroids have been associated with a spectrum of obstetric complications ranging from early pregnancy loss, pain due to red degeneration, and malpresentation to preterm labor, placental abruption, intrauterine growth restriction, and increased rates of cesarean delivery [3]. Submucosal and large intramural fibroids, in particular, are known to distort the uterine cavity and impair implantation, placentation, and fetal growth. Intrapartum and postpartum complications such as dysfunctional labor, retained placenta, and postpartum hemorrhage also pose significant clinical challenges in women with fibroids [4].

The pathophysiological mechanisms by which fibroids impact pregnancy include compromised uterine contractility, vascular insufficiency, mechanical distortion, and alterations in placental perfusion [5]. These effects are not only influenced by the type and topography of the fibroids but also by their dynamic growth during pregnancy, stimulated by estrogen and other pregnancy-related hormones. While some studies suggest that fibroids may regress postnatally, their behavior during gestation remains unpredictable, often necessitating individualized monitoring and management [6].

In developing countries like India, particularly in semi-urban and rural settings, the impact of fibroids on pregnancy is further compounded by delayed diagnosis, limited antenatal follow-up, and lack of advanced surgical facilities. This highlights the need for comprehensive assessment and management protocols to address the dual burden of fibroids and pregnancy-related complications [7,8].

Given the increasing clinical encounters of fibroids in pregnancy and the inconsistent data regarding their exact impact, there exists a need to explore this association in more detail, especially in real-world tertiary care settings. This prospective study was therefore conducted at the Department of Obstetrics and Gynaecology, Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India, over a period of 8 months, with the aim of assessing the various effects of uterine fibroids on maternal and perinatal outcomes. The study focuses on evaluating fibroid characteristics, pregnancy complications, labor outcomes, and neonatal parameters, to guide future antenatal surveillance and delivery planning strategies.

## Materials and Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology at Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India, from May 2024 to December 2024. The aim of the study was to evaluate the effects of uterine fibroids on maternal and perinatal outcomes during pregnancy. Ethical clearance was obtained from the institutional ethics

committee prior to study initiation. Informed written consent was obtained from all participants after explaining the nature and purpose of the study.

The study population included pregnant women attending the antenatal clinic or admitted for delivery who were diagnosed with uterine fibroids via ultrasonography during any trimester of pregnancy. Inclusion criteria were pregnant women with singleton gestation and ultrasonographically confirmed uterine fibroids regardless of fibroid type, size, or location. Exclusion criteria included multiple gestation pregnancies, presence of coexisting uterine anomalies, known cases of coagulation disorders, previous uterine surgery unrelated to fibroids, and incomplete obstetric records.

A total of 110 women fulfilling the inclusion criteria were enrolled. Detailed demographic data including age, parity, and obstetric history were collected. Clinical evaluation and obstetric examination were carried out. Ultrasonography reports were reviewed to determine the number, size, type (intramural, subserosal, or submucosal), and location (fundal, anterior, posterior, lower uterine segment) of the fibroids. The largest diameter of the dominant fibroid was recorded. Serial growth of fibroids during pregnancy was also monitored in a subset of women undergoing repeated scans.

Maternal outcomes evaluated included pain abdomen (due to red degeneration or pressure effects), threatened abortion, antepartum hemorrhage (placenta previa or abruption), preterm labor, mode of delivery (normal vaginal delivery, cesarean section), intrapartum complications (obstructed labor, malpresentation), and postpartum hemorrhage. The need for intraoperative intervention such as myomectomy or uterine artery ligation during cesarean was also documented.

Perinatal outcomes assessed were gestational age at delivery, birth weight, Apgar score at 5 minutes, NICU admission, stillbirths, and early neonatal deaths (within 7 days). Preterm birth was defined as delivery before 37 completed weeks of gestation, and low birth weight was defined as birth weight below 2.5 kg.

All women were followed up until delivery, and their labor and delivery records were reviewed. Neonates were followed until discharge or neonatal death, whichever was earlier. Data were entered in Microsoft Excel and analyzed using SPSS software version 26.0. Descriptive statistics were used to summarize baseline characteristics. Associations between fibroid characteristics and obstetric outcomes were evaluated using chi-square test and Fisher's exact test. A p-value of <0.05 was considered statistically significant.

This methodology enabled a comprehensive evaluation of how fibroids influence pregnancy progression, labor, and neonatal outcomes, thereby facilitating risk stratification and the development of individualized antenatal and intrapartum care plans.

## Results

A total of 110 pregnant women with ultrasonographically confirmed uterine fibroids were included in the study conducted over a period of 8 months. The patients were evaluated for fibroid characteristics, maternal complications during pregnancy and labor, mode of delivery, and perinatal outcomes. The results are presented below through comprehensive tables with interpretations.

**Table 1: Age Distribution of Participants (N = 110)**

| Age Group (years) | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| ≤25               | 19            | 17.3%          |
| 26–30             | 47            | 42.7%          |
| 31–35             | 31            | 28.2%          |
| >35               | 13            | 11.8%          |

**Table 2: Parity Distribution of Participants**

| Parity       | Frequency (n) | Percentage (%) |
|--------------|---------------|----------------|
| Primigravida | 42            | 38.2%          |
| Multigravida | 68            | 61.8%          |

**Table 3: Number of Fibroids per Participant**

| Fibroid Count | Frequency (n) | Percentage (%) |
|---------------|---------------|----------------|
| Single        | 40            | 36.4%          |
| Multiple (≥2) | 70            | 63.6%          |

**Table 4: Type of Fibroid Detected**

| Fibroid Type | Frequency (n) | Percentage (%) |
|--------------|---------------|----------------|
| Intramural   | 49            | 44.5%          |
| Subserosal   | 36            | 32.7%          |
| Submucosal   | 25            | 22.8%          |

**Table 5: Location of Fibroids**

| Location              | Frequency (n) | Percentage (%) |
|-----------------------|---------------|----------------|
| Fundal                | 36            | 32.7%          |
| Anterior wall         | 30            | 27.3%          |
| Posterior wall        | 25            | 22.7%          |
| Lower uterine segment | 19            | 17.3%          |

**Table 6: Maternal Complications Observed**

| Complication           | Frequency (n) | Percentage (%) |
|------------------------|---------------|----------------|
| Pain abdomen           | 42            | 38.2%          |
| Threatened miscarriage | 24            | 21.8%          |
| Preterm labor          | 30            | 27.3%          |
| Antepartum hemorrhage  | 12            | 10.9%          |
| Postpartum hemorrhage  | 16            | 14.5%          |

**Table 7: Mode of Delivery**

| Mode of Delivery        | Frequency (n) | Percentage (%) |
|-------------------------|---------------|----------------|
| Normal vaginal delivery | 52            | 47.3%          |
| Cesarean section        | 58            | 52.7%          |

**Table 8: Gestational Age at Delivery**

| Gestational Age     | Frequency (n) | Percentage (%) |
|---------------------|---------------|----------------|
| Term (≥37 weeks)    | 81            | 73.6%          |
| Preterm (<37 weeks) | 29            | 26.4%          |

**Table 9: Birth Weight of Newborns**

| Birth Weight | Frequency (n) | Percentage (%) |
|--------------|---------------|----------------|
| ≥2.5 kg      | 76            | 69.1%          |
| <2.5 kg      | 34            | 30.9%          |

**Table 10: Apgar Score at 5 Minutes**

| Apgar Score | Frequency (n) | Percentage (%) |
|-------------|---------------|----------------|
| ≥7          | 92            | 83.6%          |
| <7          | 18            | 16.4%          |

**Table 11: NICU Admission**

| NICU Admission | Frequency (n) | Percentage (%) |
|----------------|---------------|----------------|
| Yes            | 24            | 21.8%          |
| No             | 86            | 78.2%          |

**Table 12: Adverse Perinatal Outcomes**

| Outcome              | Frequency (n) | Percentage (%) |
|----------------------|---------------|----------------|
| Stillbirth           | 4             | 3.6%           |
| Early neonatal death | 2             | 1.8%           |
| No adverse outcome   | 104           | 94.5%          |

In summary, uterine fibroids in pregnancy were associated with an increased risk of maternal complications such as pain, threatened miscarriage, and preterm labor, as well as higher cesarean rates. Perinatal complications included low birth weight, NICU admissions, and a small but significant rate of adverse outcomes. The number, type, and location of fibroids were relevant predictors of obstetric risk.

### Discussion

Uterine fibroids are a frequent incidental finding during antenatal ultrasonography, particularly in women of reproductive age. Their potential to affect pregnancy and perinatal outcomes depends largely on their number, size, type, and location [9]. This prospective observational study conducted over 23 months at a tertiary care center aimed to assess the clinical implications of fibroids on maternal and neonatal outcomes during pregnancy. The findings reaffirm that uterine fibroids, while often asymptomatic, can be associated with a range of complications requiring heightened antenatal surveillance and individualized delivery planning [10,11].

In this study, the majority of pregnant women with fibroids were aged between 26 and 35 years, aligning with the age group in which fibroids and pregnancies most commonly coexist. A higher proportion of multigravida women had fibroids, reflecting the cumulative hormonal exposure and uterine remodeling with increasing parity [12]. Multiple fibroids were observed in 63.6% of participants, and intramural fibroids were the most prevalent type. These findings are in agreement with prior studies that have identified intramural fibroids as the most common variant during pregnancy [13].

Maternal complications observed in the study included pain abdomen due to red degeneration, threatened miscarriage, preterm labor, antepartum hemorrhage, and postpartum hemorrhage. Pain abdomen was the most frequent complication (38.2%) and typically resulted from red degeneration—a condition wherein rapid growth outpaces blood supply, leading to localized necrosis

and inflammation [14]. Threatened miscarriage and preterm labor were also significantly associated with fibroids, particularly when they distorted the endometrial cavity or were located near the placental site. Antepartum and postpartum hemorrhage were more likely in cases with lower segment fibroids or those affecting uterine contractility [15].

Cesarean delivery was required in 52.7% of the cases, which is notably higher than the general population. The increased cesarean rate was often due to malpresentation, obstructed labor, fetal distress, or previous cesarean section with concurrent fibroids [16]. Submucosal and lower segment fibroids, in particular, were more likely to interfere with the mechanics of labor. In some instances, fibroids were noted intraoperatively during cesarean section, though myomectomy was generally avoided due to risk of hemorrhage unless the fibroid was pedunculated or obstructive [17].

Perinatal outcomes were also influenced by fibroids. Preterm delivery occurred in 26.4% of cases, and 30.9% of neonates were of low birth weight. These complications may be attributed to reduced uteroplacental perfusion and abnormal placentation associated with fibroids, especially those in close proximity to the placenta [18]. NICU admission was necessary in 21.8% of neonates, primarily due to prematurity, low birth weight, or poor Apgar scores. Although the majority of neonates had good Apgar scores at 5 minutes, a subset required resuscitation and additional monitoring. Stillbirth and early neonatal death were infrequent but observed in a small proportion of cases, emphasizing the need for risk-based antenatal stratification [19,20].

Overall, this study emphasizes that uterine fibroids significantly affect pregnancy outcomes. While many women can carry pregnancies to term without incident, the presence of multiple or large intramural or submucosal fibroids increases the risk of complications. Routine identification of fibroids during antenatal scans, documentation of their characteristics, and closer surveillance throughout gestation can help anticipate and mitigate potential

adverse outcomes. These findings also support the need for delivery in well-equipped centers where emergency obstetric and neonatal care are readily available.

### Conclusion

This study reinforces the clinical significance of uterine fibroids during pregnancy and their association with a broad spectrum of maternal and perinatal complications. Women with fibroids, particularly those with multiple, intramural, or submucosal types, were found to be at increased risk for pain abdomen, threatened miscarriage, preterm labor, antepartum and postpartum hemorrhage, and a higher likelihood of cesarean delivery. Similarly, adverse neonatal outcomes such as low birth weight, preterm birth, increased NICU admissions, and perinatal loss, though infrequent, were observed and often correlated with the size and location of the fibroids.

The findings emphasize the importance of early identification and characterization of fibroids during antenatal care. Regular follow-up, individualized risk assessment, and delivery planning in tertiary care facilities with access to surgical and neonatal intensive care services are critical for optimizing outcomes. Proactive management strategies tailored to fibroid-related risk can significantly improve maternal and fetal prognosis and reduce preventable complications.

### References

1. Cagan M, Tanacan A, Donmez HG, Fadiloglu E, Unal C, Beksac MS. The Effect of Small Size Uterine Fibroids on Pregnancy Outcomes in High-risk Pregnancies. *Rev Bras Ginecol Obstet.* 2020 Sep;42(9):535-539. doi: 10.1055/s-0040-1713913. Epub 2020 Sep 29. PMID: 32992356; PMCID: PMC10309216.
2. Yarali H, Bukulmez O. The effect of intramural and subserous uterine fibroids on implantation and clinical pregnancy rates in patients having intracytoplasmic sperm injection. *Arch Gynecol Obstet.* 2002 Jan;266(1):30-3. doi: 10.1007/pl00007491. PMID: 11998961.
3. Kan X, Shen X, Feng L, Hu Y, Yu J, Yang X. Comparison of safety and efficacy between laparoscopic myomectomy and traditional laparotomy for patients with uterine fibroids and their effect on pregnancy rate after surgery. *Exp Ther Med.* 2021 Sep;22(3):913. doi: 10.3892/etm.2021.10345. Epub 2021 Jun 29. PMID: 34306187; PMCID: PMC8281455.
4. Stewart EA, Laughlin-Tommaso SK, Catherino WH, Lalitkumar S, Gupta D, Vollenhoven B. Uterine fibroids. *Nat Rev Dis Primers.* 2016 Jun 23;2:16043. doi: 10.1038/nrdp.2016.43. PMID: 27335259.
5. Pritts EA, Parker WH, Olive DL. Fibroids and infertility: an updated systematic review of the evidence. *Fertil Steril.* 2009 Apr;91(4):1215-23. doi: 10.1016/j.fertnstert.2008.01.051. Epub 2008 Mar 12. PMID: 18339376.
6. Jenabi E, Khazaei S. The effect of uterine leiomyoma on the risk of malpresentation and cesarean: a meta-analysis. *J Matern Fetal Neonatal Med.* 2018 Jan;31(1):87-92. doi: 10.1080/14767058.2016.1275553. Epub 2017 Jan 17. PMID: 28027686.
7. Brady PC, Stanic AK, Styer AK. Uterine fibroids and subfertility: an update on the role of myomectomy. *Curr Opin Obstet Gynecol.* 2013 Jun;25(3):255-9. doi: 10.1097/GCO.0b013e3283612188. PMID: 23562956.
8. Zepiridis LI, Grimbizis GF, Tarlatzis BC. Infertility and uterine fibroids. *Best Pract Res Clin Obstet Gynaecol.* 2016 Jul;34:66-73. doi: 10.1016/j.bpobgyn.2015.12.001. Epub 2015 Dec 23. PMID: 26856931.
9. Doğan S, Özyüncü Ö, Atak Z. Fibroids During Pregnancy: Effects on Pregnancy and Neonatal Outcomes. *J Reprod Med.* 2016 Jan-Feb;61(1-2):52-7. PMID: 26995889.
10. Ikhen DE, Bulun SE. Literature Review on the Role of Uterine Fibroids in Endometrial Function. *Reprod Sci.* 2018 May;25(5):635-643. doi: 10.1177/1933719117725827. Epub 2017 Aug 22. PMID: 28826369; PMCID: PMC6344955.
11. Horne AW, Critchley HO. The effect of uterine fibroids on embryo implantation. *Semin Reprod Med.* 2007 Nov;25(6):483-9. doi: 10.1055/s-2007-991046. PMID: 17960533.
12. Chang KM, Chen MJ, Lee MH, Huang YD, Chen CS. Fertility and pregnancy outcomes after uterine artery occlusion with or without myomectomy. *Taiwan J Obstet Gynecol.* 2012 Sep;51(3):331-5. doi: 10.1016/j.tjog.2012.07.002. PMID: 23040912.
13. Styer AK, Jin S, Liu D, Wang B, Polotsky AJ, Christianson MS, Vitek W, Engmann L, Hansen K, Wild R, Legro RS, Coutifaris C, Alvero R, Robinson RD, Casson P, Christman GM, Christy A, Diamond MP, Eisenberg E, Zhang H, Santoro N; National Institute of Child Health and Human Development Reproductive Medicine Network. Association of uterine fibroids and pregnancy outcomes after ovarian stimulation-intrauterine insemination for unexplained infertility. *Fertil Steril.* 2017 Mar;107(3):756-762.e3. doi: 10.1016/j.fertnstert.2016.12.012. Epub 2017 Jan 12. PMID: 28089575; PMCID: PMC5472203.
14. Ludwig PE, Huff TJ, Shanahan MM, Stavas JM. Pregnancy success and outcomes after uterine fibroid embolization: updated review of published literature. *Br J Radiol.* 2020 Jan;93(1105):20190551. doi: 10.1259/bjr.20190551. Epub 2019 Oct 8. PMID: 31573326; PMCID: PMC6948071.

15. Usadi RS, Marshburn PB. The impact of uterine artery embolization on fertility and pregnancy outcome. *Curr Opin Obstet Gynecol*. 2007 Jun;19(3):279-83. doi: 10.1097/GCO.0b013e3281099659. PMID: 17495646.
16. Torre A, Paillusson B, Fain V, Labauge P, Pelage JP, Fauconnier A. Uterine artery embolization for severe symptomatic fibroids: effects on fertility and symptoms. *Hum Reprod*. 2014 Mar;29(3):490-501. doi: 10.1093/hum-rep/det459. Epub 2014 Jan 15. PMID: 24430777.
17. Karlsen K, Mogensen O, Humaidana P, Kesmodel US, Ravn P. Uterine fibroids increase time to pregnancy: a cohort study. *Eur J Contracept Reprod Health Care*. 2020 Feb;25(1):37-42. doi: 10.1080/13625187.2019.1699047. Epub 2019 Dec 10. PMID: 31821047.
18. Sunkara SK, Khairy M, El-Toukhy T, Khalaf Y, Coomarasamy A. The effect of intramural fibroids without uterine cavity involvement on the outcome of IVF treatment: a systematic review and meta-analysis. *Hum Reprod*. 2010 Feb;25(2):418-29. doi: 10.1093/hum-rep/dep396. Epub 2009 Nov 12. PMID: 19910322.
19. Lethaby A, Vollenhoven B. Fibroids (uterine myomatosis, leiomyomas). *BMJ Clin Evid*. 2015 Jun 2;2015:0814. PMID: 26032466; PMCID: PMC4451527.
20. Jun SH, Ginsburg ES, Racowsky C, Wise LA, Hornstein MD. Uterine leiomyomas and their effect on in vitro fertilization outcome: a retrospective study. *J Assist Reprod Genet*. 2001 Mar;18(3):139-43. doi: 10.1023/a:1009403819377. PMID: 11411428; PMCID: PMC3455590.