

ORIGINAL RESEARCH

To determine the association between uterine leiomyomas and various maternal and fetal complications occurring during pregnancy, delivery and puerperium

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ABSTRACT

Aim: To determine the association between uterine leiomyomas and various maternal and fetal complications occurring during pregnancy, delivery and puerperium.

Material and methods: Antenatal women visiting S.M.G.S Hospital with singleton pregnancy and USG documented fibroid was selected for the study, after an informed consent from the patient, specific demographic and clinical information was collected which includes: maternal age, obstetric history, menstrual history, period of gestation, details regarding fibroid and fetal presentation etc.

Results: Majority of patients in our study were multigravida i.e., 56% and remaining 44% were primigravida. Majority of patients in our study had a solitary fibroid i.e., 60% the remaining 40% had more than 1 fibroid. 36% of the cases in our study had premature rupture of membranes. Antepartum hemorrhage in the form of placenta previa or abruptio placenta was seen in 16% of the cases in our study. Cephalic presentation of the fetus was most common and was seen in 60% of the cases, 24% presented had breech presentation, 12% had a variable lie whereas 4% of the patients had a transverse lie of the fetus. Cholestasis of pregnancy was the most common co morbidity found in 20% of patients, followed by gestational hypertension seen in 18% patients, next was hypothyroidism seen in 16% of patients and least common being gestational diabetes mellitus seen in 2% of patients.

Conclusion: Pregnant individuals diagnosed with uterine leiomyomas an elevated likelihood of undergoing cesarean delivery, experiencing breech presentation, and encountering postpartum hemorrhage. The various characteristics of uterine leiomyomas have distinct impacts on maternal and fetal outcomes via diverse mechanisms.

Keywords: Uterine leiomyomas, Maternal, Fetal, Puerperium

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INTRODUCTION

Leiomyomas (fibroids) are benign, monoclonal tumors of the smooth muscle cells of the myometrium and contain large aggregations of extracellular matrix composed of collagen, elastin, fibronectin, and proteoglycan.¹ Fibroids are monoclonal and are made up of concentric smooth muscle fibers and fibrous connective tissue surrounded by a vascular pseudocapsule.² The development of fibroids is influenced by hormones such as estrogen and progesterone thus fibroids are most prevalent during reproductive years and regress after menopause, hence it was evident that factors that increase exposure to estrogen such as early menarche and obesity increases the risk of fibroids, whereas factors which reduce

exposure to estrogen such as smoking, exercise and increased parity are protective. Research suggests that there is increased levels of aromatase within fibroids, thus *de novo* production of estradiol is higher than in normal myometrium.³ Progesterone is also very important in the pathogenesis of fibroids especially in those with increased concentrations of progesterone receptors A and B, compared with normal myometrium.^{4,5} Growth Factors, proteins or polypeptides, like Transforming growth factor- β (TGF- β), basic fibroblast growth factor (bFGF), vascular endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), and insulin like growth factor (IGF) produced locally by smooth muscle cells and fibroblasts, appear to modulate

cellular growth, proliferation, and differentiation and stimulate fibroid growth primarily by increasing extracellular matrix.⁶

MATERIAL AND METHODS

This study was conducted as a cross sectional study in the department of Obstetrics and Gynecology, S.M.G.S (Shri Maharaja Gulab Singh) Hospital Jammu, over a period of one year, after proper institutional ethical approval and informed written consents from the participants. Antenatal women

visiting S.M.G.S Hospital with singleton pregnancy and USG documented fibroid was selected for the study, after an informed consent from the patient, specific demographic and clinical information was collected which includes: maternal age, obstetric history (gravidity, parity, previous mode of delivery, history of abortions and instrumentations), menstrual history, period of gestation, details regarding fibroid and fetal presentation etc.

RESULTS

The age group of patients in our study ranged from 20 to 39 years with the mean age being 30.2 ± 3.60 years.

Table: 1 Obstetric history in the study group

OBSTERIC HISTORY	NO. OF PATIENTS	PERCENTAGE OF TOTAL
G1	22	44%
G2A1	7	14%
G2P1L0	1	2%
G2P1L1	8	16%
G3A2	2	4%
G3P1L1A1	2	4%
G3P2L2	4	8%
G4P1L1A2	2	4%
G5P1L1A3	2	4%
TOTAL	50	100%

Majority of patients in our study were multigravida i.e., 56% and remaining 44% were primigravida. Majority of patients in our study had a solitary fibroid i.e., 60% the remaining 40% had more than 1 fibroid.

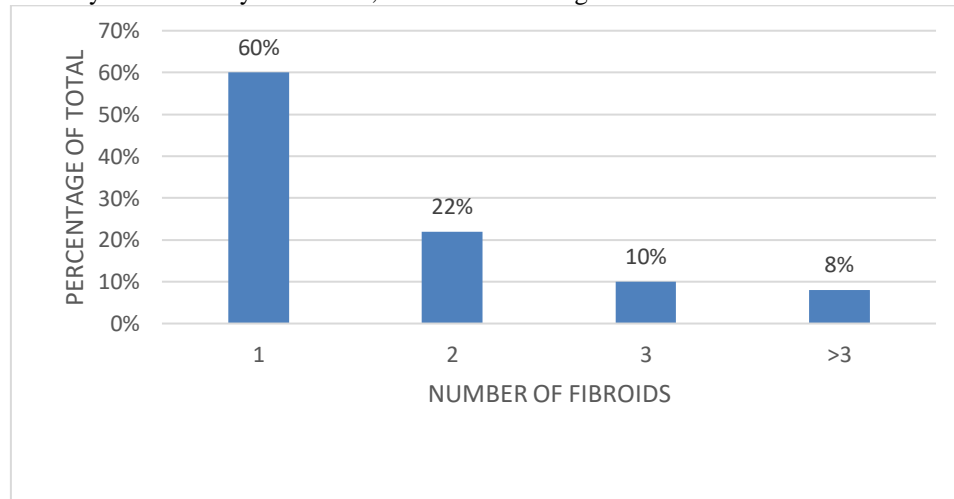


Fig : 1 Bar graph diagram showing frequency of number of fibroids in study group.

Table: 2 Types of fibroids in the study group

Type	No. Of Patients	Percentage Of Total
INTRAMURAL	26	52%
INTRAMURAL + SUBSEROSAL	13	26%
SUBSEROSAL	11	22%
TOTAL	50	100%

The most common type of fibroid found among the patients in our study was intramural alone seen in 52% cases, next most common being subserosal along with intramural seen in 26% cases and lastly subserosal alone being 22%. 16% of the patients in our study underwent abortions which included missed, incomplete and inevitable abortions. 20% of patients in our study suffered a pregnancy loss whereas 80% patients had a successful pregnancy.

Table: 3 Preterm births in the study group

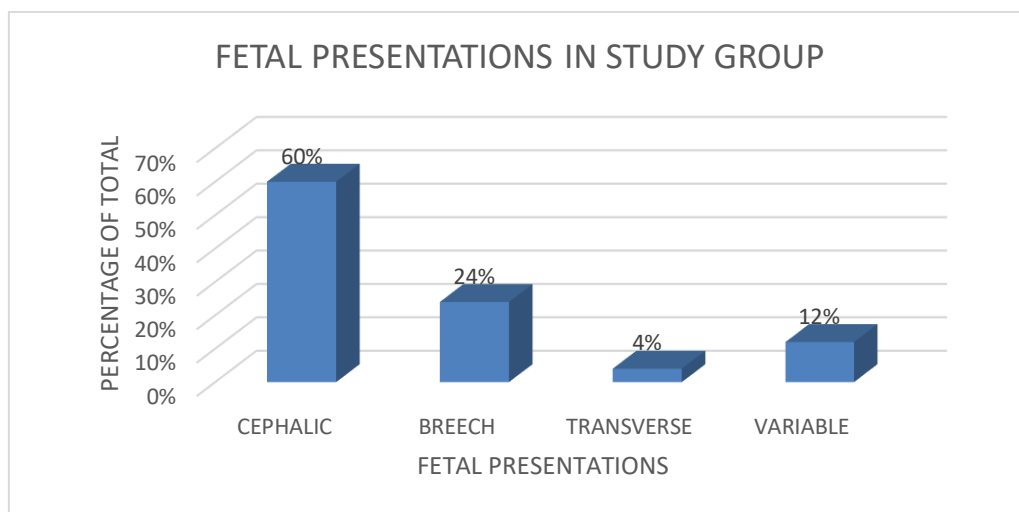
	No. Of Patients	Percentage Of Total
YES	11	22%
NO	39	78%
TOTAL	50	100%

22% of the cases in our study underwent a preterm delivery.

Table: 4 Premature rupture of membranes in the study group

	No. Of Patients	Percentage Of Total
YES	18	36%
NO	32	64%
TOTAL	50	100%

36% of the cases in our study had premature rupture of membranes. Antepartum hemorrhage in the form of placenta previa or abruption placenta was seen in 16% of the cases in our study. Cephalic presentation of the fetus was most common and was seen in 60% of the cases, 24% presented hadbreech presentation, 12% had a variable lie whereas 4% of the patients had a transverse lie of the fetus.

**Fig: 2 Bar diagram chart showing frequency of various fetal presentations in the study group****Table: 5 Maternal co morbidities in the study group**

Comorbidities	No. Of Patients	Percentage Of Total
ANEMIA	3	6%
CHOLESTASIS OF PREGNANCY	10	20%
GESTATIONAL DIABETES MELLITUS	1	2%
GESTATIONAL HYPERTENSION	9	18%
HYPOTHYROIDISM	8	16%
HYPOTHYROIDISM + ANEMIA	1	2%
NO COMORBIDITY	18	36%
TOTAL	50	100%

Cholestasis of pregnancy was the most common co morbidity found in 20% of patients, followed by gestational hypertension seen in 18% patients, next was hypothyroidism seen in 16% of patients and least common being gestationaldiabetes mellitus seen in 2% of patients.

Table 6: Mode of termination of pregnancy in our study

Mode Of Termination Of Pregnancy	No. Of Patients	Percentage Of Total
LSCS	28	56%
LSCS + MYOMECTOMY	1	2%
SPONTANEOUS EXPULSION OF FETUS	5	10%
SUCTION AND EVACUATION	3	6%
VAGINAL DELIVERY	13	26%
TOTAL	50	100%

Majority of patients in our study i.e., 56% underwent a lower segment caesarean section (LSCS), 26% underwent a vaginal delivery, 10% had a spontaneous expulsion of fetus, 6% underwent suction and evacuation and 1 patient underwent a Cesarean myomectomy. 28% of the patients in our study had uterine atony in the immediate post-partum period. 36% of the patients had a bout of post-partum haemorrhage with 10 patients requiring blood transfusion. The mean fetal weight as per our study was 2.45 kg with a standard deviation of ± 1.17 kg.

Table: 7 APGAR score at 1 minute

APGAR Score	No. Of Patients	Percentage Of Total
0/10	2	4%
6/10	2	4%
8/10	13	26%
10/10	25	50%
NOT APPLICABLE	8	16%
TOTAL	50	100%

At 1 minute of birth majority of the newborn had an APGAR score of 10/10 i.e., 26% had an APGAR score of 8/10 and 4% had an APGAR score of 6/10.

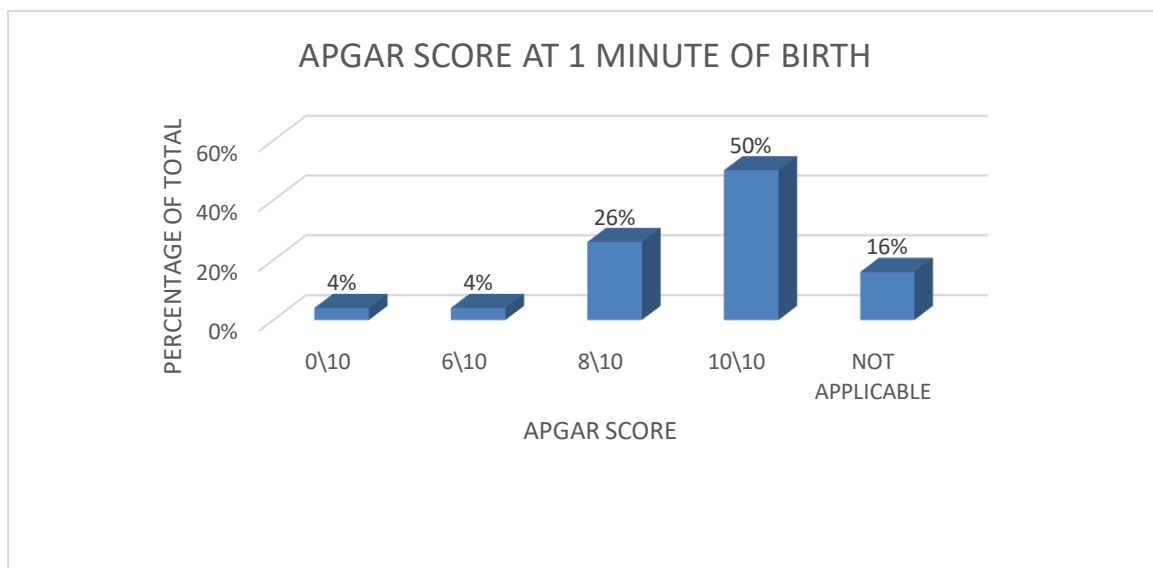


Fig :3 Bar diagram chart showing APGAR scores at 1 minute of birth in the study group.

Table 8: APGAR score at 5 minutes

APGAR Score	No. Of Patients	Percentage Of Total
0/10	2	4%
8/10	2	4%
10/10	38	76%
NOT APPLICABLE	8	16%
TOTAL	50	100%

At 5 minutes of birth 76% of the new-born had an APGAR score of 10/10 and 4% had an APGAR of 8/10.

Table: 9 Obstetric outcomes between patients with single or multiple fibroids.

Characteristics	Multiple fibroids (n=21)	Single fibroid (n=29)	p-value
PRE-TERM	8 (38.09%)	3 (10.34%)	0.019
PROM	8 (38.09%)	10 (34.48%)	0.793
APH	2 (9.52%)	6 (20.69%)	0.288
BREECH	10 (47.61%)	2 (6.89%)	<0.001
MODE OF TERMINATION OF PREGNANCY			0.013
1. LSCS	14 (66.66%)	15 (51.72%)	
2. VAGINAL DELIVERY	1 (4.76%)	12 (41.38%)	
3. SPONTANEOUS EXPULSION	3 (14.28%)	2 (6.89%)	

OF FETUS			
4. SUCTION AND EVACUATION	3 (14.28%)	0 (0%)	

Statistically significant differences were noted in terms of pre-term delivery, Breech presentation of the foetus, and the mode of termination of pregnancy with regards to the multiplicity of the fibroids. 38.09% of patients with multiple fibroids had a delivery whereas 10.34% of patients with single fibroids had a preterm delivery. (p-value<0.05). 47.61% of patients with multiple fibroids had breech presentation of the foetus whereas 6.89% of the patients with single fibroid had breech presentation of the foetus. (p-value<0.05). There was a statistically significant difference in the mode of termination of pregnancy (p-value<0.05), with 66.66% of patients with multiple fibroids undergoing LSCS whereas 51.72% of the patients with single fibroid underwent LSCS. Only 4.76% of patients with multiple fibroids had a vaginal delivery whereas 41.38% of the patients with single fibroid had a vaginal delivery. 14.28% of the patients with multiple fibroids had spontaneous expulsion of the foetus whereas 6.89% of patients with multiple fibroids had a spontaneous expulsion of the foetus. Suction evacuation was required in 14.28% of patients with multiple fibroids and no patient with single fibroid underwent suction evacuation.

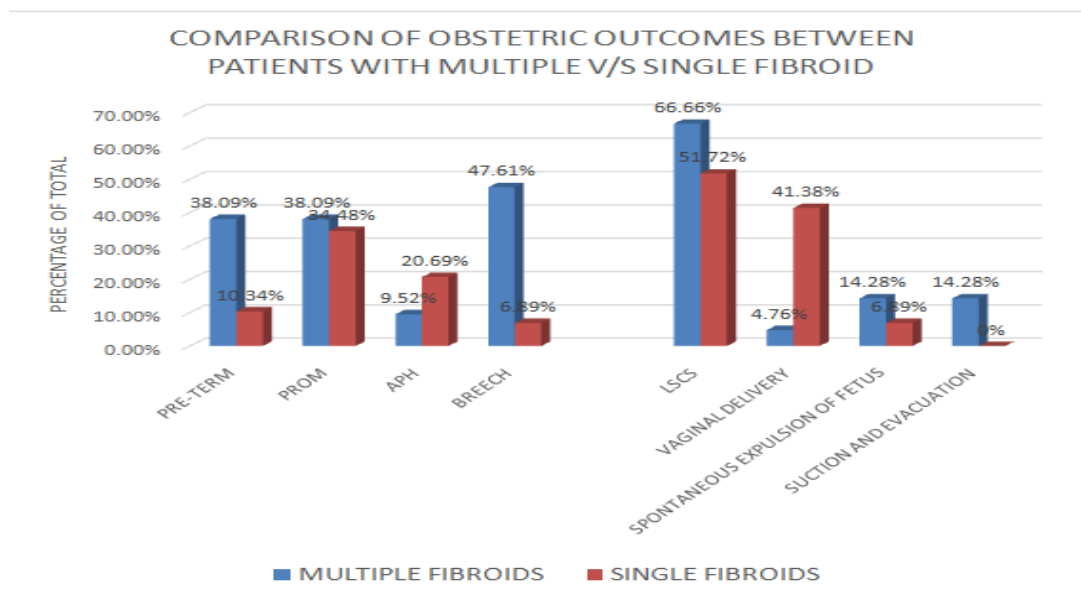


Fig: 4 Bar diagram chart showing various obstetric outcomes among patients with single v/s multiple fibroids in the study group.

DISCUSSION

A prospective study on 50 patients presenting with a singleton pregnancy and USG documented uterine fibroids was conducted over a period of one-year w.e.f. November 2021 to October 2022 and all the maternal and fetal outcomes noted. In our study the age of the patients ranged from 20-39 years with the mean age being 30.2 years with a standard deviation of ± 3.6 years. This corresponded with the findings of Qidwai GI *et al.*, (2006)⁷ in their study on 'Obstetric outcomes in women with sonographically identified uterine leiomyomata' where the mean maternal age was found to be 33.7 years; and the findings of Lam SJ *et al.*, (2014)⁸ in their study on 'The impact of fibroid characteristics on pregnancy outcome' where the maternal age group ranged from 20 to 46 years with median maternal age group being 32 years. Majority (56%) of patients in our study were multigravida. The preponderance of Multigravida patients has also been noted by Stout MJ *et al.*, (2010)⁹ in their study 'Leiomyomas at routine second-trimester ultrasound examination and adverse obstetric

outcomes' where the average gravidity of the patients was 2.60 ± 1.6 . 60% of patients in our study had a solitary fibroid and remaining 40% had multiple fibroids, similar findings have been reported by Benson CB *et al.*, (2001) in their study.¹⁰ Among the patients in our study, majority had only intramural fibroids (53%), 26% patients had an Intramural + Subserosal fibroid, and 22% patients had only Subserosal fibroids. Similar results have been reported by De Vivo A *et al.*, (2010), in their study 'Uterine myomas during pregnancy: a longitudinal sonographic study' where they found intramural fibroids to be present in 90.5% of their patients.¹¹ 16% of the patients in our study underwent an abortion. These findings were similar to that of Lam SJ *et al.*, (2014), in whose study 22 of the 179 cases (12.3%) underwent a miscarriage.⁸ Among the patients in our study group, 20% underwent a pregnancy loss in either first, second or third trimester of pregnancy. Similar findings were recorded by Benson CB *et al.*, (2001)¹⁰ who observed that the rate of pregnancy loss in patients with uterine fibroids in their study (14%)

was nearly double than those without fibroids (7.6%). Similarly, Stout MJ *et al.*, (2010)⁹ also noted that the rate of intra uterine fetal demise among the patients with uterine fibroids in their study (1.6%) was nearly double than that of those without fibroids (0.7%). 22% of the patients in our study delivered preterm, that is between 28 to 37 weeks period of gestation. Our findings corresponded with those of Qidwai G *et al.*, (2006) who reported that 19.2% of the patients in their study having fibroids delivered preterm.⁷

The rate of premature rupture of membranes among the patients in our study was 36%. Arisoy R *et al.*, (2016) observed that the presence of pregnancy associated leiomyoma was a risk factor for premature rupture of membranes (OR: 6.7, 95% CI 1.4-32.4).¹² 16% patients in our study presented with antepartum haemorrhage in the form of placenta previa or abruptio placenta. Similar findings were reported by Rice J *et al.*, (1989), who observed occurrence of antepartum haemorrhage (abruptio placenta) in 17.6% patients having a fibroid with greatest diameter of 3 to 4.9cm and 10.3% in those having a fibroid with greatest diameter \geq 5cm.¹³ In majority of patients in our study, fetus had a cephalic presentation (60%). However, breech was the most common malpresentation seen in 24% patients. Arisoy R *et al.*, (2016) reported that the presence of pregnancy associated leiomyoma is a risk factor for breech presentation and other abnormal presentations (OR: 9.7, 95% CI 2.8-34.2).¹² Of the 42 patients in our study who crossed the period of viability, majority (69%) underwent lower segment caesarean section among which one patient additionally underwent a myomectomy. A significantly higher rate of LSCS was also reported by Saleh H *et al.*, (2018) in whose study 85% patients underwent LSCS.¹⁴ Occurrence of uterine atony in the immediate post-partum period was noted in 28% patients in our study. Similar findings were noted by Ortiz F *et al.*, (2011) who reported that uterine atony was more frequent in patients with fibroids than in patients without fibroids (12.3 vs 4.2%, RR = 2.9, 95% CI 1.2-7.6, p = 0.036).¹⁵ Post-partum haemorrhage (blood loss >1000 ml) was reported in 36% patients in our study with 10 patients requiring blood transfusion. An increased risk of occurrence of severe post-partum haemorrhage among patients with fibroids as compared to those without (OR 2.57, 95% CI 1.54 – 4.27) was noted by Qidwai G *et al.*, (2006).⁷ The mean fetal weight as per our study was 2.45 kg with a standard deviation of \pm 1.17kg. Lam S *et al.*, (2014) reported that the mean fetal birth weight in case of patients having multiple fibroids was 3.00 (\pm 0.865) kg, those having a solitary fibroid had a mean fetal weight of 3.18 (\pm 0.653) kg.⁸ At 1 minute of birth majority of the new-born had an APGAR score of 10/10 i.e., 26% had an APGAR score of 8/10 and 4% had an APGAR score of 6/10. By 5 minutes of birth 76% of the new-born had an APGAR score of 10/10 and 4% had an APGAR of 8/10. Ciavattini A *et al.*, (2015) reported that among

the patients in their study 2.9% with multiple fibroids and 3.8% patients with single fibroid had an APGAR score of \leq 7 at 1 minute of birth and no patient with multiple fibroids and only 0.5% with solitary fibroid had an APGAR score of \leq 7 at 5 minutes of birth.¹⁶ Statistically significant differences were noted in terms of pre-term delivery, breech presentation of the foetus, and the mode of termination of pregnancy with regards to the multiplicity of the fibroids. 38.09% of patients with multiple fibroids had a pre-term delivery whereas 10.34% of patients with single fibroids had a pre-term delivery. (p-value < 0.05) 47.61% of patients with multiple fibroids had breech presentation of the foetus whereas 6.89% of the patients with single fibroid had breech presentation of the foetus. (p-value < 0.05). There was a statistically significant difference in the mode of termination of pregnancy (p-value < 0.05), with 66.66% of patients with multiple fibroids undergoing LSCS whereas 51.72% of the patients with single fibroid underwent LSCS. Only 4.76% of patients with multiple fibroids had a vaginal delivery whereas 41.38% of the patients with single fibroid had a vaginal delivery. 14.28% of the patients with multiple fibroids had spontaneous expulsion of the foetus whereas 6.89% of patients with multiple fibroids had a spontaneous expulsion of the foetus. Suction evacuation was required in 14.28% of patients with multiple fibroids and no patient with single fibroid underwent suction evacuation. In concurrence with our findings, Ciavattini A *et al.*, (2015) noted that 34 women with multiple fibroids delivered at a significantly earlier gestational age compared to women without fibroids (37.5 \pm 3 weeks versus 39.3 \pm 1.5 weeks, mean \pm SD, p < 0.001) and to women with a single fibroid (37.5 \pm 3 weeks versus 39.2 \pm 1.4 weeks, mean \pm SD, p < 0.001).¹⁶ They also noted a significantly higher rate of breech presentation and cesarean section women with multiple fibroids, while no correlation with placenta previa, placental abruptio, IUGR and lower Apgar score at birth was found. Saleh H *et al.*, (2018), in a similar study, noted that there were no significant differences between patients with single or multiple fibroids as regards the obstetric outcome.¹⁵

CONCLUSION

Pregnant individuals diagnosed with uterine fibroids face an elevated likelihood of undergoing cesarean delivery, experiencing breech presentation, and encountering postpartum hemorrhage. The various characteristics of uterine fibroids have distinct impacts on obstetric outcomes via diverse mechanisms. The provision of comprehensive information of this nature could prove beneficial in the process of risk stratification for pregnant women diagnosed with fibroids.

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