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Prospective Study on Obstetric Outcome in Pregnant Females after Previous Spontaneous Abortion

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Abstract: ***Background*: Spontaneous abortion is the commonest early pregnancy complication, significantly affecting physical and mental health. Women with previous spontaneous abortion should be managed as high risk in subsequent pregnancy to prevent adverse materno-fetal outcomes. *Methods*: prospective observational study (N=200) at tertiary institute, to estimate incidence of previous abortion, and analyse maternal, obstetric and perinatal outcomes. *Results*: Incidence of spontaneous abortion = 9.5%, majority patients were 21-30 years (mean 27.12 years). 71.5% were nulliparous and 24% had parity of one. 70% had one, 22.5% had two and 7.5% had three previous spontaneous abortions. Frequent medical comorbidities were hypertensive disorders, diabetes mellitus, anaemia and autoimmune disorders. Common pregnancy complications included FGR, APH, preterm labour, oligohydramnios, low APGAR, and NICU admission. Out of 184 births, 30% of babies born were low birth weight, mean APGAR score = 7.63. Out of 173 livebirths, 19.7% required NICU admission. Perinatal mortality rate = 5.2%. *Conclusion*: Women with previous spontaneous abortion have increased risk of recurrence of abortion, FGR, preterm labour, and low birth weight. As the number of abortions increase, the incidence of low birth weight increases. Patients with multiple spontaneous abortions have increased risk of caesarean section mainly because of placenta previa.***

Keywords: spontaneous abortion, miscarriage, high risk pregnancy

1. Introduction

Spontaneous abortion or miscarriage is defined as the loss of pregnancy before foetal viability. The American College of Obstetricians and Gynaecologists (ACOG) estimates that it is the most common form of pregnancy loss and early pregnancy complication. Approximately 26% of all conception end in abortion[1-4.] Moreover, 80% of early pregnancy loss occurs in the first trimester[2, 3.]

Spontaneous pregnancy loss is both physically and mentally painful for the couple and considered as a negative life occurrence, and this loss may cause significant psychological distress to the couple, which is often not evaluated well. Apart from medical complications, more attention is given to psychological impact created by abortion on the couple, which can occur immediately or a considerable period of time after the abortion.

According to the recommendations of the World Health Organization, women should wait for 6 months after an abortion and before attempting to become pregnant again[5.] However, about 50 to 80% of women become pregnant again soon after the abortion, and the next pregnancy is at risk of causing anxiety and depression in the mother[6.]

Prognosis of the outcome of the current pregnancy after history of previous spontaneous abortion is very unpredictable, there is increased risk of recurrence of abortion. If pregnancy continues, there is increased risk of complications like: preterm labour, foetal growth restriction, low birth weight, poor APGAR score, NICU admission; there is also increased risk of placental abruption, placenta previa, malpresentations and intrauterine foetal death[7]. According to recent statistics, it has been estimated that during 2010– 2014, about 56 million abortions occurred each year worldwide. The estimated global abortion rate in the same period is 35 per 1,000 for married women and 26 per 1,000 for unmarried women[8.] In India, it has been observed that occurrence of spontaneous abortion is higher in urban that rural areas[9.] According to the first national study of the incidence of abortion and unintended pregnancy in India, conducted jointly by International Institute for Population Sciences (IIPS), Mumbai; the Population Council, New Delhi; and the New York–based Guttmacher Institute, an estimated 15.6 million abortions occurred in the country in 2015[10.]

Hence pregnancies with prior history of spontaneous abortions should be considered as high-risk pregnancy and adequate foetal surveillance is required during ante-natal period to prevent adverse outcomes and improve pregnancy prognosis.

2. Methodology

Study Design: Prospective Observational Study
Study setting: Labor room of a tertiary care municipal hospital

Study population: Pregnant women with previous spontaneous abortion

Sample Size: 200

Duration of the study: 18 months (January 2020 to August 2021)

Sampling Method: Convenient Sampling Method

Aim & Objectives

1) To know the incidence of previous spontaneous abortion in pregnant females
2) To study the maternal complications/ outcome
3) To study the obstetric outcome and the mode of termination as normal delivery/ LSCS/ preterm delivery/ recurrence of abortion
4) To identify high risk cases
5) To assess perinatal outcomes – FGR, IUFD, Preterm Birth, Low Birth Weight

Inclusion Criteria:
1) Patients with history of spontaneous abortion irrespective of cause and period of gestation
2) All pregnant women with previous 1 or more spontaneous abortion
3) Age group 18-40 yrs.
4) Patient with one live birth followed by spontaneous abortion.

Exclusion Criteria:
1) Medical termination of pregnancy/ Induced abortion
2) Women with multiple pregnancy
3) Women not willing to give consent.
4) History of carcinoma

Ethical committee clearance
Approval was taken from the Institutional Ethics Committee (IEC). The purpose of the study explained to the study subjects. Informed written consent in local language was taken before enrolment for study. Questionnaire was translated to local language i.e. Marathi and back translated to English for validation. Patients' participation was kept entirely confidential, and privacy of the data was maintained. Study was initiated after ethical committee approval.

Data Collection
For all women with previous spontaneous abortion, informed valid consent was taken and complete ANC profile and special investigations, ultrasonography were done and the data entered in the patient information sheet, and followed up in the ANC clinic for complete 9 months till delivery and the outcome was studied and incidence of termination mode whether normal delivery/ LSCS/ preterm / full term and associated complications were studied. Data analysis was done using statistical software SPSS version 22.0

3. Results & Discussion

A prospective observational study was conducted on 200 pregnant women with previous history of spontaneous abortion at a tertiary care municipal hospital to evaluate incidence of previous spontaneous abortion in pregnant females, and to study maternal complications/outcomes, obstetric outcomes and perinatal outcomes. All pregnant women with previous history of spontaneous abortion coming to the Labor room of a tertiary care municipal hospital were consecutively recruited until the sample size was achieved.

Out of 200 patients, 165 (82%) were registered and followed up in ANC clinic and 35 (18%) were not registered. The incidence of spontaneous abortion was 9.5%

Susheela Singh et al (2018) [11] reported the first large-scale study specifically designed to estimate abortion incidence in India. At 47 abortions per 1000 women aged 15–49 years, the abortion rate in India is within the range of reported estimates of abortion incidence in three other south Asian countries. L. Bussi et al (2006) [12] reported the corresponding spontaneous abortion rate was 16.3% when register-based data were used. This is in line with some previous studies [11, 12] but is a little higher than in a recent Danish register based study (13.5%) [13] Zinaman MJ et al (1996) [3] reported 12–15% of clinically recognized pregnancies spontaneously aborted. In China, Lewington S, et al (2014)[14] & Gao J, et al(2015)[15] reported the prevalence as 6%–14%.

Majority of patients (66.5%) belonged to the age group 21-30 years, with mean age 27.12 years.

Similarly L. Buss et al. (2006) [12] observed majority of study subjects 830 were from 27 -29 years of age group. Muzaffar et al. (2020) [16] found majority of the patients (39.2%) were in the age group of 25-30 years, Agrawal S et al (2015)[17]found that out of total, 40 (57.1 %) patients belong to the age group 21-29 years. Risk of spontaneous abortions increases with increased maternal age due to the chromosomal abnormalities (abnormal karyotype) in egg[18,19.]

98 patients (49%) were gravida 2, 65 (32.5%) were gravida 3 and 37 (18.5%) were gravida 4 or higher. 143 patients (71.5%) were nulliparous and 57 (28.5%) were parous. 141 patients (70.5%) had one previous abortion, 45 (22.5%) had 2 and 14 (7%) had three or more previous abortions.

Agrawal S et al (2015) [17] found that 32 (45.7%) were with history of previous one abortion, 27 (38.6%) with previous two abortions, 10 (14.3 %) with previous three abortions. Nehal N et al (2019) [20] reported 37 were with history of previous one abortion & 13 were with previous two abortions. S.A. Brigham, et al (1999) [21] reported that 157 (48%) had three previous abortions, 79 (24%) had two previous abortions, and 43(13%) had four previous abortions.

A total of 184 women gave birth, of which 173 were live births (127 full-term and 46 preterm) and 11 were stillbirths. Agrawal S et al (2015) [17] found that most common pregnancy outcome was term live birth (72.85%) followed by abortion (14.3%), preterm delivery (8.6%), still birth (2.9%) & missed abortion (1.4%) respectively. Muzaffar et al. (2020) [16] found that 15.7% of the patients had threatened abortion and 11.2% had complete abortion. Further, it was found that patients with pre-term delivery and PROM were 14.2% and 9.25%, respectively. CH Rama et al. (2015)[22] found in comparison with women with a previous successful pregnancy, those with a prior miscarriage have an increased risk of recurrence of abortion, instrumental delivery, PROM, preterm delivery and ectopic pregnancy.

52.2% (n=96) of babies born were low birth weight (<2.5 kg), of which 36 (19.6%) were very low birth weight (<2kg). Pallavi R Gangatkar et al (2017) [23] reported that low birth weight was observed in 22.85% of Cases compared to 10% in

Control group which was statistically significant (p < 0.04%). Bhattacharya et al (2008) [24] reported an adjusted risk of 1.6 and adjusted OR of 2.8 and p value <0.001. Similar results were concluded in studies by Goldhaber MK, Fireman BH (1991)[25] too.

Statistically significant correlation was noted (p=0.04) between number of previous spontaneous abortions and parity, suggesting that women with multiple previous spontaneous abortions are less likely to be parous. Meanwhile, parous women had a fewer number of previous spontaneous abortions.

In cases with previous 1 spontaneous abortion, most common pregnancy outcome was full term livebirth 89 (n=89, 63%) followed by preterm livebirth (n=33, 23.5%).

In cases with previous 2 spontaneous abortions, most common pregnancy outcome was full term livebirth (n=26, 58%) followed by preterm livebirth (n=13, 87%)

In cases with previous 3 spontaneous abortions most common pregnancy outcome was full term livebirth (n=12, 85%) followed by repeat abortion (n=2, 14%).

In cases with previous 1 spontaneous abortion, most common pregnancy complication was FGR (n=37), followed by PROM (n=30), and oligohydramnios (n=22).

In cases with previous 2 spontaneous abortion, most common pregnancy complication was oligohydramnios (n=16), followed by FGR (n=14) and antepartum haemorrhage (n=10).

In cases with previous 3 spontaneous abortion, most common pregnancy complication was APH (n=13), followed by FGR (n=2), PROM (n=2) and oligohydramnios (n=2).

Pregnancy outcome varies according to the extent of spiral artery remodeling. Partial remodeling disorder is prone to be complicated by preterm birth and fetal growth restriction without pregnancy-induced hypertension; complete remodeling disorder is often accompanied by pre-eclampsia. Patients with early-onset PE may have early placental implantation defects and spiral artery remodeling disorders, leading to placental ischemia ultimately causing abortion [26-31]. Thus, pre-eclampsia and fetal growth restriction is strongly correlated with history of spontaneous abortion as found in our study.

Muzaffar et al. (2020) [16] found that fetal outcome in 72% of patients was without any complication and low birth weight was found in 9.2% of patients and IUGR in 7.1% of patients and low APGAR in 8.5% of patients. Agrawal S et al (2015)[17] found that 35.8% patients showed different complications like threatened abortion, pre-eclampsia, antepartum hemorrhage, preterm labor and intrauterine death. In study of women with 3 or more miscarriages, Reginald et al (1987)[32] reported higher rates of small for gestational age babies, preterm deliveries and perinatal mortality. CH Rama et al. (2015)[22] found in comparison with women with a previous successful pregnancy, women with an initial miscarriage have an increased risk of preterm delivery and low birth weight. Bhattacharya et al (2008) [33] reported that women with an initial miscarriage have an increased risk of preeclampsia, threatened miscarriage, antepartum hemorrhage, induced labor, instrumental delivery and manual removal of placenta. Kashanian M et al (2006)[34] found that there was risk of repeat abortion (16.5%), fetal death (1.5%) and higher rate of cesarean section (28.1%) previous miscarriage cases. Sheiner et al (2005)[35] in their study of 7503 patients of recurrent abortion demonstrated higher risk of complications like abruptio placentae, hypertensive disorders and caesarean section.

In cases with previous 1 spontaneous abortion, most common maternal comorbidity was hypertensive disorders (n=24), followed by diabetes mellitus (n=8).

In cases with previous 2 spontaneous abortions, most common maternal comorbidity was hypertensive disorders (n=16), followed by diabetes mellitus (n=3).

In cases with previous 3 spontaneous abortion most common maternal comorbidities was Autoimmune disorder (n=7), followed by hypertensive disorders (n=2).

Muzaffar et al (2020)[16] and Kashanian et al (2006)[34] found that increased risk of pre-eclampsia in patients with previous abortion. Taylor et al (1993)[36] reported an increased incidence of placenta previa in patients with a previous abortion, supporting the present study. The findings of our study were similar to the Goldhaber MK, et al (1991)[25] which suggests that women with prior spontaneous abortion are at risk of preeclampsia, SGA, FGR, abruption, fetal distress, chorioamnionitis, preterm labor, and neonatal complications.

In cases with previous 1 spontaneous abortion (n=129), most common mode of delivery was spontaneous vaginal delivery (n=47, 36.43%), followed by caesarean section (n=46, 35.66%).

In cases with previous 2 spontaneous abortion (n=43), most common mode of delivery was caesarean section (n=27, 62.79%), followed by induced vaginal delivery (n=11, 25.58%).

In cases with previous 3 spontaneous abortion (n=12), most common mode of delivery was caesarean section (n=12, 100%).
Agrawal S et al (2015)[17] found that mode of delivery was vaginal in 70%, instrumental delivery in 6.7%, and caesarian section in 23.3%. Muzaffar et al. (2020)[16] found mode of delivery in 42% of patients was caesarean section, followed by normal vaginal delivery in 37% and assisted vaginal delivery in 3.5% areas.

In cases with previous 1 spontaneous abortion, most common indication for LSCS was foetal distress.

In cases with previous 2 spontaneous abortion, most common indication for LSCS was antepartum haemorrhage (7): Placenta previa> Abruption placenta

In cases with previous 3 spontaneous abortion, most common indication for LSCS was antepartum haemorrhage (12): Placenta previa> Abruption placenta

Previous history of abortion for which dilatation and curettage or other uterine instrumentation was done can disrupt endo-myometrial lining and cause scarring which could lead to abnormal placentation and give rise to placenta previa (low lying placenta) or become a part of placenta accreta syndrome (PAS).

Out of 200 women in the study, 184 (92%) gave birth, out of which 173 were live births (94%) and 11 stillbirths (6%), suggesting an overall favourable prognosis for women with previous spontaneous abortions. Of the 173 liveborns, 115 (66.47%) had APGAR scores of more than 8/10, while 46 (26.59%) had APGAR scores of 6-7 and 12 (6.94%) had APGAR scores of 5 or lower. A total of 34 neonates (19.65%) required NICU care. The commonest indications for NICU admission were low birth weight (n=11), prematurity (n=10), birth asphyxia (n=7), and meconium aspiration syndrome (n=6).

Muzaffar et al. (2020)[16] found low APGAR in 8.5% of patients. Weintraub AY et al (2011)[37] observed a higher incidence of APGAR scores <7 at 1 and 5 minutes among women with a previous abortion.

In subjects with history of previous spontaneous abortion, full term live birth is the most common outcome followed by preterm live birth. There is increased incidence of recurrence of abortion in patients with history of previous abortion.

Common pregnancy and foetal complications encountered are foetal growth restriction, antepartum haemorrhage, preterm labour, oligohydramnios, low APGAR score, and NICU admission.

In subjects with history of previous spontaneous abortion, maternal comorbidities commonly seen are autoimmune disorders, pre-eclampsia, eclampsia, and gestational diabetes mellitus. There is increased incidence of LSCS in patients with history of abortion. Majority of the babies were delivered with birth weight less than 2.5kg (low birth weight babies/small for gestational age). Thus, overall results of our study shows that women with history of previous spontaneous abortion should be considered as high risk in subsequent pregnancy and requires careful monitoring and adequate foetal surveillance to avoid adverse outcomes.

4. Conclusion

Patients with history of spontaneous abortion have increased risk of recurrence of abortion, intrauterine growth restriction, preterm labor, and low birth weight in subsequent pregnancies. As the number of abortions increases, the incidence of low birth weight increases. Patients having history of three & two spontaneous abortion have more chances of caesarean section mainly because of placenta previa, fetal distress & severe IUGR with severe oligohydramnios respectively.

Proper detailed history should be taken from all the patients, pre-conceptional investigations should be done mainly ultrasonography to rule out any uterine anomaly in patients with history of abortion. These females should be thoroughly evaluated as they might have some comorbidities which maybe undiagnosed in previous pregnancy which terminated as an early pregnancy loss; so as to initiate appropriate management.

Therefore, we conclude in our study that every pregnancy with previous history of spontaneous abortion should be considered as a high risk pregnancy and should be evaluated pre-conceptionally and psychological evaluation of the female should also be undertaken and addressed. After confirmation of pregnancy, they should carefully be monitored with adequate fetal surveillance throughout ANC period to avoid adverse outcomes.

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Table 1: Distribution of study subjects according to pregnancy outcome after previous spontaneous abortion

Pregnancy outcome	Previous 1 spontaneous abortion (n=141)	Previous 2 Spontaneous abortion (n=45)	Previous 3 Spontaneous abortion (n=14)
Full-term live born	89	26	12
Preterm live born	33	13	0
Abortion	9	2	2
Ectopic	3	0	0
Stillbirth	7	4	0

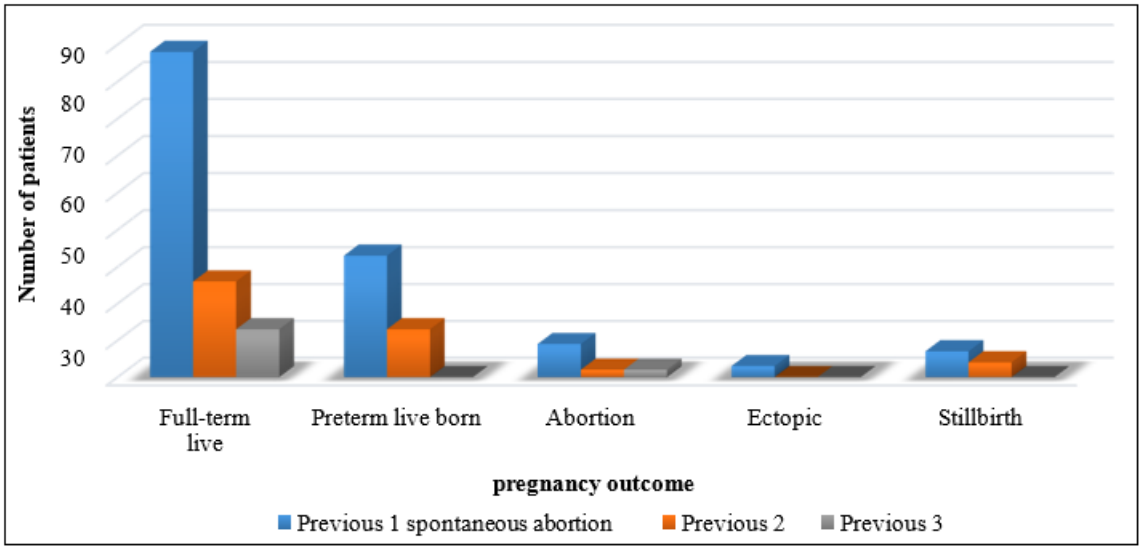

Figure 1: Distribution of study subjects according to pregnancy outcome after previous spontaneous abortion

Table 2: Distribution of study subjects according to pregnancy complication after previous spontaneous abortion

Fetal outcome	Previous 1 spontaneous Abortion	Previous 2 Spontaneous abortion	Previous 3 Spontaneous abortion
IUGR	37	14	2
PROM	30	7	2
PPROM	12	0	0
Polyhydramnios	11	3	0
Oligohydramnios	22	16	2
APH	8	10	13

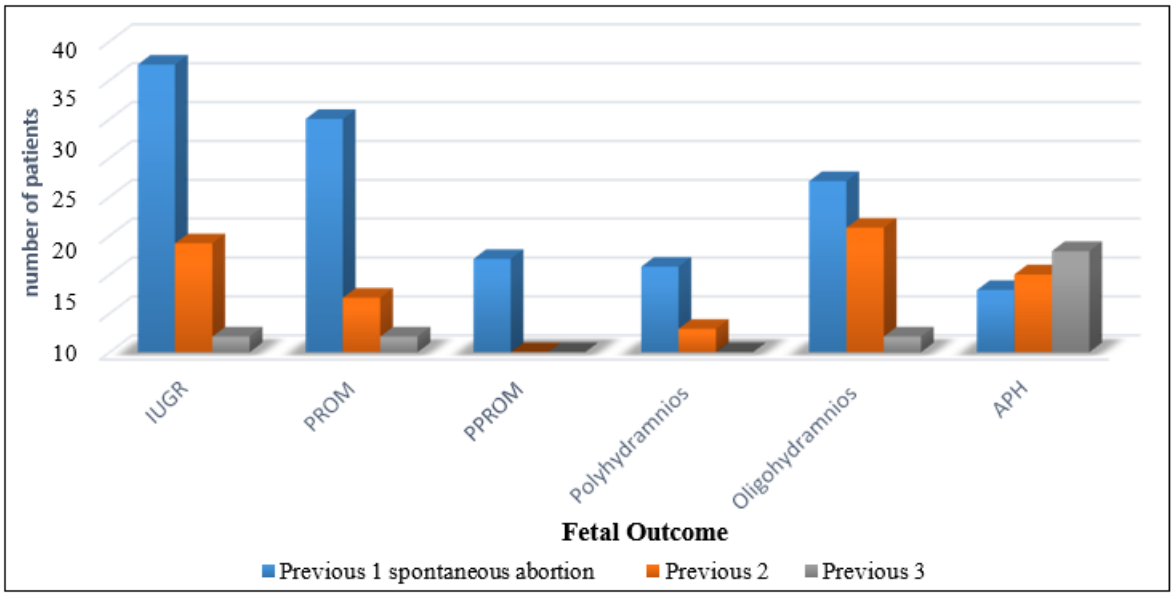

Figure 2: Distribution of study subjects according to pregnancy complication after previous spontaneous abortion

Table 3: Distribution of study subjects according to medical disorders /maternal comorbidities

Maternal comorbidities	Previous 1 spontaneous abortion	Previous 2 Spontaneous abortion	Previous 3 Spontaneous abortion
Anemia	2	0	0
Autoimmune disorder	0	3	7
Hypertension In pregnancy- 1-chronic hypertension 2-pre-eclampsia 3-eclampsia	24	16	2
Diabetes mellitus	8	3	0
Nephrotic syndrome with chr.HTN	0	2	0

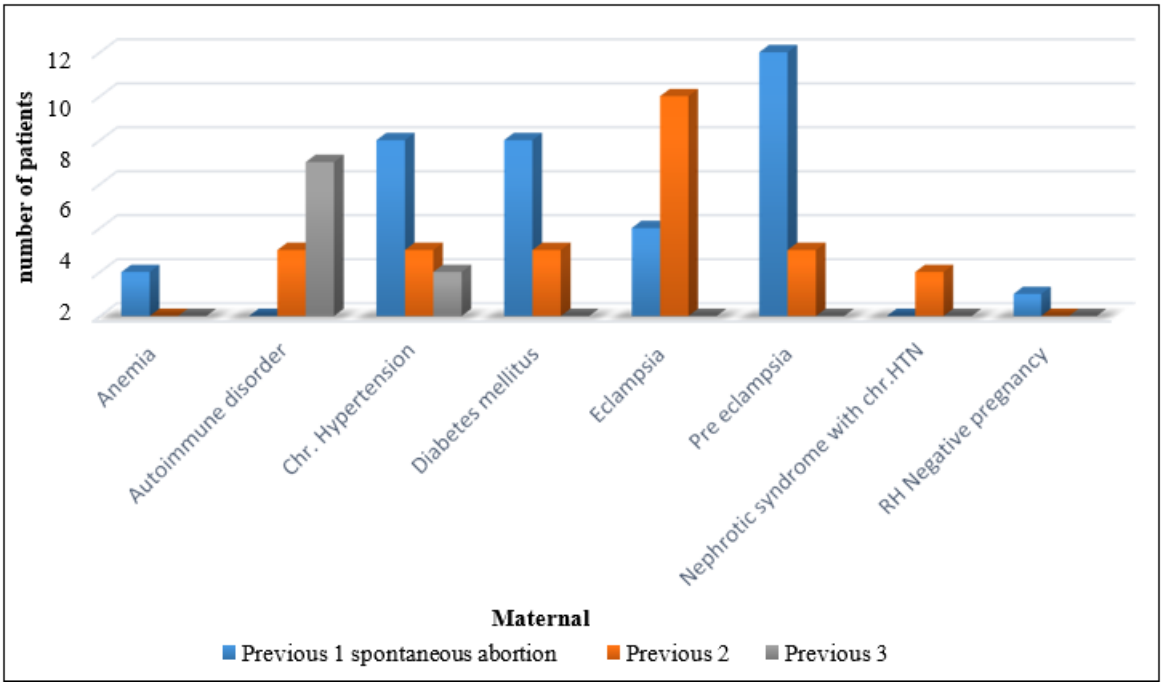

Figure 3: Distribution of study subjects according to medical disorders/ maternal comorbidities

Table 4: Distribution of study subjects according to mode of delivery

Mode of delivery	Previous 1 spontaneous abortion (n=129)	Previous 2 Spontaneous abortion(n=43)	Previous 3 Spontaneous abortion (n=12)
Spontaneous Vaginal Delivery	47	5	0
Induced Vaginal Delivery	30	11	0
Forceps delivery	6	0	0
LSCS	46	27	12

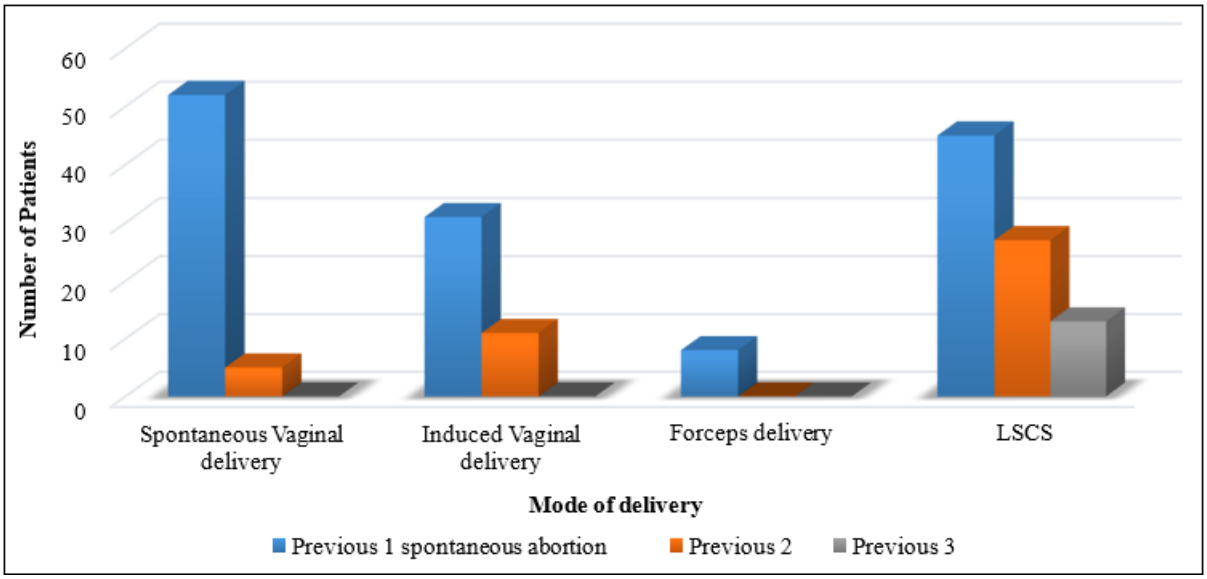

Figure 4: Distribution of study subjects according to mode of delivery after previous spontaneous abortion