Original Research Article

Pregnancyoutcomefollowingprevious miscarriage at Benghazi medical center

Abstract:

Background: Spontaneous abortion is the most common complication of pregnancy, causing substantial consequences. The effects of miscarriage on the outcome of the next pregnancy is a rich subject for research.
Aim: to assess association between history of miscarriage and increase risk of adverse outcome in future pregnancy.
Method: A case series study among women with history of miscarriage andregular antenatal follow up, they had delivered at Maternity department (Benghazi Medical Center (BMC) during 1st may 2021 to 30th April 2022 (eleven months).
Results: The study included 103 mothers with a previous history of miscarriage. Advanced maternal age rate was 48.5%, working mothers were 39.8% of the study population and 42.72% were obese.
Ourresultsasfollowing28.0%ofparticipatesdevelopedplacentaprevia.onlyone participate in our study developed preeclampsia and no one developed eclampsia and 9 participants their pregnancies end with miscarriage around 15participants in this study developed vaginal bleeding in first trimester without significant impact on pregnancy outcome.

Conclusion and recommendation: Although this study does not show much impact of history of miscarriage on pregnancy outcome, and because heterogeneity of results weneedto evaluate pregnancy outcome following either a previous spontaneous or a recurrent miscarriage, the findings of the present and previous studies In addition to further research with large enough sample sizes and controlling for intervening factors.

1. INTRODUCTION

According to the World Health Organization, spontaneous abortion, also known as miscarriage, is defined as the spontaneous loss of a pregnancy before completion of 20 weeks gestational age. After miscarriage, women may experience intense grief and yearning for the lost future with the infant, with an emphasis on lost hopes and dreams. [1]

The effects of previous miscarriage on maternal emotional health during and after subsequent pregnancy are often studied in combination with women with a history of other types of perinatal loss including electively induced abortion, stillbirth, and neonatal death, or various combinations. Very few studies of the effects of previous miscarriage alone on subsequent pregnancy and birth are available. It is also called early pregnancy loss or spontaneous abortion.Miscarriage is fairly common. Between 15% and 20% (15 to 20 out of 100) of all confirmed pregnancies end in miscarriage. [1]

About 125 000 miscarriages occur annually in the United Kingdom,resulting in 42000 hospital admissions. Although miscarriages mostly resolve spontaneously without treatment and rarely cause severe maternal morbidity[2], but the true rate of miscarriage is probably higher because many losses occur preclinically, before a menstrual period is missed. [2]

Miscarriage has a variety of causes such as chromosomal abnormalities, immunological thrombophilias, Uterine malformations, Infections and Lifestyle factors; Alcohol, coffee, smoking, advanced maternal age, and BMI $\geq$30 kg/m ^{2}. [3]

Early loss of a pregnancy causes great distress to couples and undermines their confidence in achieving future reproductive success a single miscarriage has nottraditionallybeenperceivedasamajorclinicalproblem.Itisrarelylife

threatening, its diagnosis and management is usually straight forward, and any prejudicial effect on future reproductive potential remains unproven on the other hand a retrospective analysis of prospectively collected data from the recurrent miscarriageandobstetricdatabasesattheJessopWing,RoyalHallamshireHospital between 2001 and 2007. [4]

Women with recurrent miscarriage had significantly increased odds of lowApgarscoresatone(OR1.57,95%CI1.20–2.05)andfiveminutes(OR2.0,95% CI1.23–3.27),SGA(OR1.96,95%CI1.12–3.43),pretermdelivery(OR1.64, 95%CI1.22–2.19) admission to SCBU (OR 1.75,95% CI1.29–2.36)and perinatal death (OR 3.08, 95% CI 1.44–6.58). Regarding maternal outcomes, there were significantly increased odds for only APH (OR 7.67, 95% CI 4.23–13.91). [5]

In addition to higher risk of pre-eclampsia in pregnant women with a history of miscarriage[6] the overall risk of pre-eclampsia was 5.4% (1121/20 846). A totalof 3159 women (15.2%) reported previous miscarriage,three or more consecutive miscarriages were reported by 0.6% (130/20 846). [6]

Several studies based on large populations suggest that the previous miscarriage is associated with adverse pregnancy outcomes. [7,8]

In particular, previous miscarriage was found to be associated with an increase in the rate of pre-eclampsia. [9]

Recurrentmiscarriagesmayalsoimpacttheperinataloutcomes.[10–13]

The purpose of the present study was to determine the effect of a spontaneous miscarriage on the outcome of the next pregnancy.

2. REVIEWOFTHE LITERATURE:

Kashanian M et al (2006) [7] showed that the pregnancy complications following a previous spontaneous miscarriage were no different from those of the control group, except for abortion (16.5 vs. 11%, *P* = 0.003, RR = 1.15, CI 95% = 0.95–1.39),fetaldeaths(1.5vs.0%,*P*=0.004,RR=1.51,CI95%=1.39–1.63), and vaginal bleedingduringthefirst trimester(19vs.1%, *P*= 0.001,RR=1.57,CI 95% = 1.41–1.75), which were more than those of the control group. Also, the rate of cesarean delivery (28.14 vs. 13.48%) was increased (p = 0.026, RR = 1.25, CI 95% = 1.07–1.47). Neonatal complications were not statistically significantly different in comparison with the control group. A prior spontaneous miscarriage isa risk for the next pregnancy, and the risk of abortion and intrauterine fetal death will increase. Therefore, careful prenatal care is mandatory. [7]

According to Abdelazim IA et al (2017) [8], recurrent miscarriage (RM) is defined as ≥3 consecutive pregnancy losses before 22 weeks` gestation. Five to fifteen percent of RM women have significantly elevated anti-phospholipid antibodies, and 85%of the RM couples had elevated levels of spermDNAdamage. Endometrial stromal cells from women with RM are more receptive (super receptivity) for low-quality embryos. The risk of sporadic and/or RM increased in women with positive thyro-peroxidase antibodies (TPOAb), and the risk of miscarriage doubled in women with TSH >2.5 mIU/L in the first trimester. A systematic review concluded that the prevalence of all uterine malformations was 15.4% among RM women. Women with body mass index ≥25 kg/m2 have increased risk of miscarriage compared to women with BMI <25 kg/m2. IVF with prenatal genetic testing suggested as treatment for RM due to chromosomal abnormalities. [8]

The majority of women (65-85%) with uterine malformations as bicornuate or septate uterus have successful pregnancy after metroplasty, and thehysteroscopic metroplasty should be done only for women with septate uteri, after failed previous IVF-ET trials. Empirical progesterone may beneficial for women with ≥3 consecutive miscarriages immediately preceding their current pregnancy. Combination of lower molecular weight heparin, and aspirin is superior to aspirin alone in the treatment of RM due to antiphospholipid syndrome. [8]

In a study by Bhattacharya S et al (2009) [4] included all women living in the Grampian region of Scotland with a pregnancy recorded in the Aberdeen Maternity and Neonatal Databank between 1986 and 2000, the miscarriage group faced a higher risk of pre-eclampsia (adj OR 3.3, 99% CI 2.6-4.6), threatened miscarriage (adjOR1.7,99%CI1.5-2.0),inducedlabour(adjOR2.2,99%CI1.9-2.5), instrumentaldelivery(adjOR5.9,99%CI5.0-6.9),pretermdelivery(adjOR2.1, 99% CI 1.6-2.8) and low birthweight (adj OR 1.6, 99% CI 1.3-2.1) than group A. They were more likely to have threatened miscarriage (adj OR 1.5, 99% CI 1.4-1.7),inducedlabour(adjOR1.3,99%CI1.2-1.5),postpartumhemorrhage(adj OR 1.4, 99% CI 1.2-1.6) and preterm delivery (adj OR 1.5, 99% CI 1.2-1.8) than group B. They concluded that an initial miscarriage is associated with a higher risk of obstetric complications. [4]

Experience of one or more previous miscarriages can increase the risks in a subsequent pregnancy. Fortunately for most women, absolute risk of future complications remains low. However, this does suggest the need for greater vigilance in the next pregnancy and obstetric surveillance of women should not be restricted to those with recurrent miscarriage. [4]

Trogstad L et al (2009) [9] found that an increased risk of pre-eclampsia, although not statistically significant, was found for women with recurrent miscarriages (adjusted OR 1.51, 95% CI 0.80-2.83). Women who had ever been treated for infertility also had increased risk (adjusted OR 1.29, 95% CI 1.05-1.60). When these two risk factors were combined, the adjusted odds ratio for pre-eclampsia was 2.40 (95% CI 1.11-5.18).Conclusions: The study supports the hypothesis that infertility, recurrent miscarriage and pre-eclampsia share elements of the same etiological factors. **[9]**

Ford HB, and Schust DJ (2009) statedthat the diagnosis of Recurrent PregnancyLoss (RPL) canbequitedevastating,but rather; it canbe helpful forthe physician and patient to keep in mind the relatively high likelihood that the next pregnancy will be successful. Correction of endocrine disorders, antiphospholipid antibody (APA), and anatomic anomalies have the highest success rates, approximately 60% to 90%. While patients with a cytogenetic basis for loss experience a wide range of success (20%–80%) that depends on the type of abnormality present.Even with the diagnosis of RPL and as many as 4 to 5 prior losses, a patient is more likely to carry her next pregnancy to term than to have another loss. [10]

Field K et al (2015) [11] in retrospective cohort study of 30 053 women with a singleton pregnancy who booked for antenatal care and delivery between January 2008 and July2011 compared the obstetric and perinatal outcomes of 2030 women (6.8%) who had a history of three or more miscarriages (recurrent miscarriage)with the outcomes of 28 023 women (93.2%) who did not. Results showed that women with a history of recurrent miscarriage were more likely to be obese, tohave undergone assisted conception, to have had a previous perinatal death, and to be delivered by scheduled Caesarean section. Recurrent miscarriage was associated

withanincreasedincidenceofpretermbirth(<37weeksgestation,8.1versus5.5%, adjOR1.54;95%CI1.29-1.84),verypretermbirth(<32weeksgestation,2.2 versus 1.2%, adjOR 1.80; 95% CI 1.28-2.53), and perinatal death (1.2 versus 0.5%, adjOR 2.66; 95% CI 1.70-4.14). The results were similar for both primary and secondary recurrent miscarriage. The affected women have not been categorized according to etiology of recurrent miscarriage and it may be that adverseoutcomes differ according to etiological subgroup. Wider implications of the findings:This studyhighlightstheneed for specialistobstetric care for women who have had three or more previous miscarriages, particularly in relation to the risk of pretermdelivery. Studyfunding/competinginterests: Therewasnospecificfunding obtained for this study and there is no conflict of interests. [11]

Jivraj S et al (2001) [12] investigated obstetric and neonatal outcomes of women who had a history of recurrent miscarriage were compared with a control population from 1 January 1992 to 30 June 1998. Amongst a total of 162 pregnancies which progressed beyond 24 weeks gestation in women with a history of recurrent miscarriage, there were four perinatal deaths and 16 babies were admitted to the special care baby unit. The rates of preterm delivery (13%), small-for-gestational-age (13%), perinatal loss (2.5%) and Caesarean section (36%) were significantly ($P < 0.05$) higher than those of the control group (3.9, 2.1, 1 and16.7% respectively). The ratio of male to female babies was equal. There was no significant difference in the incidence of hypertension or diabetes between the two groups. Patients with recurrent miscarriage represent a population at high risk of obstetric problems and close surveillance in the antenatal period is therefore required. [12]

Terada K et al (2015) [14] reviewed the obstetric records of all 5,829 nulliparous pregnant women who delivered at > 14 weeks' gestation from 2008 through2013atperinatalcenter.Ofthesewomen,74hadahistoryofrecurrent

miscarriage (1.3%). The control population consisted of 4,176 nulliparous women without a history of miscarriage. Demographic information and characteristics of labor were extracted from patient charts. The rate of maternal age > 40 years ($p<0.01$) and the rate of in vitro fertilization use ($p<0.01$) were higher in women withrecurrentmiscarriagethaninwomen withoutmiscarriage.Eleven women with recurrent miscarriage (14.9%) were treated with low-dose aspirin with and without subcutaneous heparin. In addition, the rate of cesarean delivery was higher in women with recurrent miscarriage than in women without miscarriage ($p=0.02$). However, fetal/neonatal outcomes did not differ significantly between the populations. The pregnancyof women witha historyof recurrent miscarriageis not associated with adverse outcomes at our perinatal center. [14]

Fawzy M et al (2016) [5] in a retrospective case control study that analyzed data collected prospectively between 2001 and 2007 from 400 women with history of recurrent miscarriage who achieved pregnancies progressing beyond 24 weeks gestation compared to 39,860 deliveries from the general obstetric database within the same time period. Results showed that women with recurrent miscarriage had significantly increased odds of low Apgar scores at one (odds ratios (OR) 1.57,95%CI1.20-2.05)andfiveminutes(OR2.0,95%CI1.23-3.27),smallfor gestationalage(OR1.96,95%CI1.12-3.43),pretermdelivery(OR1.64,95%CI 1.22-2.19) and antepartum hemorrhage (OR 7.67, 95% CI 4.23-13.91). The risks were increased in the presence of a male fetus but no difference was observed between primary and secondary miscarriage patients. In conclusion, women with recurrent miscarriage have an increased risk of several maternal and fetal complications and therefore may require closer monitoring during the antenatal period particularly when pregnant with a male fetus. [5]

Rushworth FH et al (2000) [15] investigated 870 consecutive, non-pregnant women with a history of three or more pregnancy losses and normal parental karyotypes were investigated for the presence of thyroglobulin antibodies (TgAb) and for thyroid microsomal antibodies (TmAb). Thyroid antibodies were found in 162 (19%) women. TgAb only were found in eight women (5%); TmAb only in 98 (60%) and both TgAb and TmAb were found in 56 (35%). Thirteen women had a history of thyroid disease and a further 15 women were found to have abnormal thyroid function. All 28 were excluded from the pregnancy outcome study. Among theremaining 134 thyroid antibodypositivewomen,36 women were not tested and normal thyroid stimulating hormone results were obtained for 98. In the group proven euthyroid, 14 of 24 untreated pregnancies resulted in live births (58%). Among the 710thyroid antibody negative women, 47 of 81 untreated pregnancies resulted in live births (58%). The future risk of pregnancy loss in women with unexplained recurrent miscarriage is not affected bytheir thyroidantibodystatus.[15]

Taylor VM et al (1993) [16] evaluated the impact of induced abortion and spontaneous abortion on the occurrence of placenta previa in later pregnancies in a population-based, case-control study conducted using 1984-1987 Washington state birth certificate data. The study population included 486 white women with a pregnancy complicated by placenta previa and 1598 randomly selected controls without placenta previa. After adjustment for confounding variables, the odds ratio in association with one or more induced abortions was 1.28 (95% CI 1.00-1.63).For one or more spontaneous abortions, the odds ratio was 1.30 (95% CI 1.01- 1.66). Women who report one or more induced or spontaneous abortions are 30% more likely to have a subsequent pregnancy complicated by placenta previa than women without suchahistory.Theresultsshould not begeneralized to areas where suction curettage is not the preferred method of induced abortion.[16]

Thom DH et al (1992) [17]evaluated the association between spontaneous abortion and subsequent adverse birth outcomes. Adverse birth outcomes were examined for women with one spontaneous abortion before the index pregnancy (n = 2146) and for women with three or more prior spontaneous abortions and noother prior pregnancies (n = 638); compared with women with no priorspontaneous abortions (n = 3099). Women with three or more prior spontaneous abortions were at higher risk for delivery at less than 37 weeks' gestation (relative risk 1.5, 95% confidence interval 1.1 to 2.1), placenta previa (relative risk 6.0, 95% confidence interval 1.6 to 22.2), having membranes ruptured greater than 24 hours (relative risk 1.8, 95% confidence interval 1.2 to 2.9), breech presentation (relative risk 2.4,95%confidenceinterval 1.6to3.6),andhaving aninfant with acongenital malformation (relative risk 1.8, 95% confidence interval 1.1 to 3.0). These findings suggest that common causes may underlie recurrent spontaneous abortion and certain adverse birth outcomes. They may also help guide clinical management of pregnancies in women with a history of recurrent spontaneous abortions. [17]

Goldenberg RL et al (1993) [18] evaluated the association between fetal loss in the second trimester and subsequent adverse birth outcomes and compared these outcomes to two groups: women who delivered at 25-36 weeks in their index pregnancy and those who delivered at term in their index pregnancy. Thirty-nine percent ofwomen who had apregnancyloss at13-24 weeks in theindex pregnancy had a preterm delivery in their next pregnancy, 5% had a stillbirth, and 6% had a neonatal death, with all outcomes worse than those found in the two control populations. Delivery at 19-22 weeks in the index pregnancy was associated with a 62% preterm delivery rate in the subsequent pregnancy. A second-trimester loss, especially one occurring at 19-22 weeks, is associated with a poor prognosis in the subsequent pregnancy. [18]

Funderburk SJ, et al (1976) [19]analyzed data from 25,958 consecutive deliveries were to determine the effect of prior abortions and premature births on current pregnancy outcome. Perinatal death rate, combining stillbirths and neonatal deaths, increased more than threefold among women with at least one prior premature in birth and at least one prior abortion and approached 18 per cent of current deliveries when there were three or more prior premature births. Abnormal live births, defined as infants with either birth weight under 2,501 grams, gestational age less than 37 weeks, or congenital anomalies, significantly increased as the number of prior abortions and premature births increased, each in a range of 0 through 3 or more. For example, among women with at least three prior premature births, there were greater than 50 per cent abnormal live births. The risk was mostly that of low birth weight and low gestational age, although there was a slight increase in congenital anomalies. The risk was reduced considerably when there were previous term births and was influenced variably by race, clinic classification, maternal illness, and prior pregnancy complications. This empirical data on pregnancy outcome should be useful in reproductive counseling among women with pregnancy losses and premature births. [19]

Knudsen UB et al (1991) [20] evaluated the risk for a clinical spontaneous abortion in a pregnancy following 0 to 4 consecutive spontaneous abortions was estimated in a large, unselected, Danish population, including approximately 300,500 pregnancies. The overall risk for spontaneous abortion was 11% and the risk for a spontaneous abortion was 16, 25, 45 and 54% after 1 to 4 previous consecutivespontaneous abortions, respectively. For women over 35 years, the risk for spontaneous abortion was significantly increased, but the almost identical abortion rates after repeated abortions in both young and old women indicate a risk factor which is not age-related. [20]

Schoenbaum SC et al (1980) [21] reviewed 5,003 records of consecutive deliveries in 1975 and 1976 at Boston Hospital for Women, abstracteddemographic and obstetric data, and analyzed singleton deliveries at 27 weeks' gestation or greater. We compared women with exactly one prior proximate induced or spontaneous abortion with women of similar gravidity or parity with no prior pregnancylosses. Offspring of women with a proximate induced abortion had no higher frequency of short gestations, low Apgar scores, or congenital malformations than those born of women with no prior loss. Offspring of secundi gravidas with aproximate abortion had birth weights similar to thoseofotherprimi gravidas. Thus we have found that women with a single prior induced abortionhave no increased risk of poor outcome of the next pregnancy after 27 weeks' gestation. In contrast, offspring of secundigravidas with a proximate spontaneous abortion had an increased frequency of short gestations, low birth weights, low Apgar scores, and congenital malformations, indicating that these women are a high-risk group for subsequent poor late pregnancy outcomes. [21]

Aimsofthestudy

To determine the effect of a spontaneous miscarriage on the outcome of the next pregnancy

Patientsandmethods

1.Designofstudyand settings:

Type of study: A prospective study among women with history of miscarriage andregular antenatal follow up,they had delivered at Maternity department (Benghazi Medical Center (BMC) during 1st may 2021 to 30th April 2022(eleven months)) .

2. Participants:

Allwomenalreadyknownwithhistoryofspontaneousmiscarriage(eithersporadic or recurrent).

Exclusioncriteria:

1. Knowncaseofuterineanomaly.
2. Cervicalincompetence(byhistoryorsonography).
3. Alcoholconsumption,cigarettesmokinganddrugmisuse.
4. Historyofcongenitalorgeneticdisordersincouplesandtheirrelatives.
5. Poorantenatal care.
6. Surgeryorradiotherapyduringcurrentpregnancy.

3. Pathway:

allparticipantswereviewtheirpastobstetric,medicalanddrughistory. in addition to pregnancy outcome in form ofmaternal complications (spontaneous abortion; vaginal bleeding in the first trimester; placenta previa; prematureruptureofthemembrane;placentalabruption;preeclampsiaand

eclampsia; preterm labor, cesarean delivery, and instrumental delivery), fetal outcome (low birth weight; Apgar score at 1 min; breech presentation; fetal death; congenital anomalies)

4. Definitions:

Advancematernalage≥35 years.

LowApgarscorewasdefinedaslessthan6

Perinatal mortality was defined as those born dead or died within 7 days of delivery.

5. Ethicalconsiderations:

Confidentialityofdatawasassuredusinganonymousformofdatacollection.

6. Statisticalanalysis:

Data were analyzed using statistical package for social science (SPSS) version 23.

Descriptivestatisticsasfrequencyandpercentage.

Inferentialstatisticswere used when needed Chi-square(X^2) test to find the difference in the distribution of the variables between the groups, *P*-value were considered significant when ≤ 0.05.

Data were presented in form of tables and figures, were the figures done by Microsoft Excel 2010.

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RESULTS

Maternalandgeneralcharacteristics:

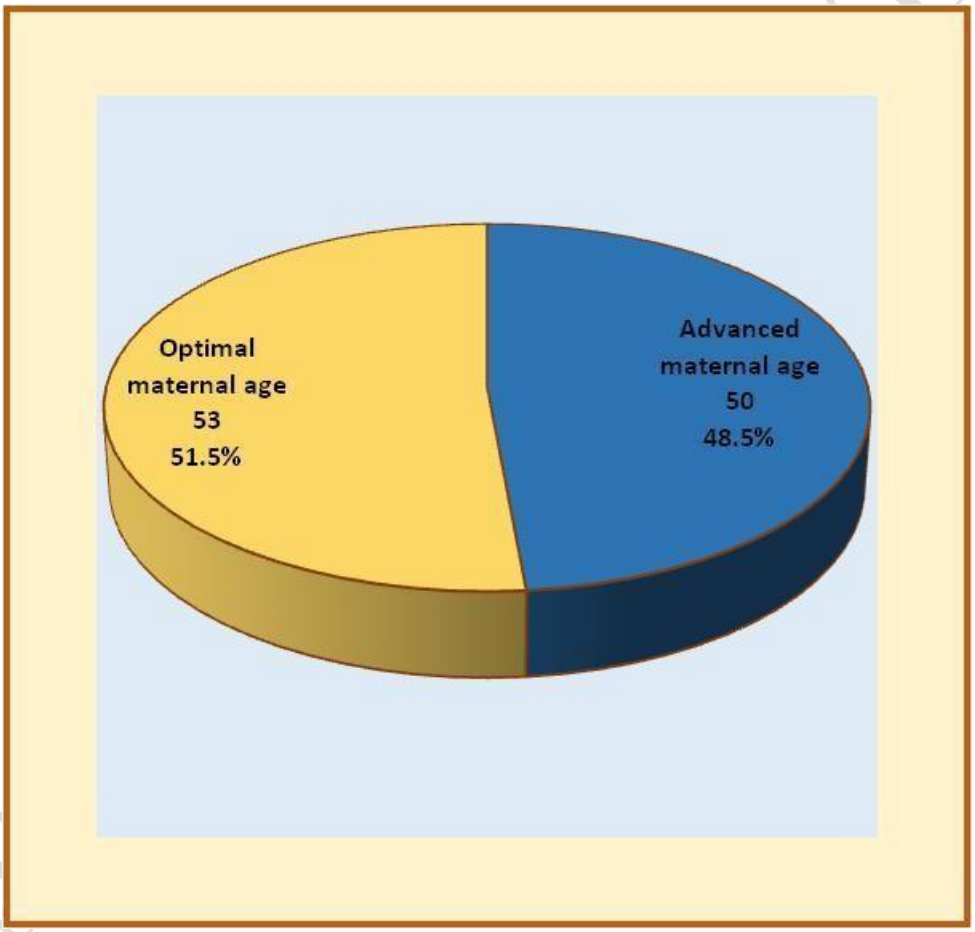

Figure1:Distributionofthestudypopulationaccordingtomaternalage
MotherAge: ranges 21– 47, Mean±SD34.30 ±6.018

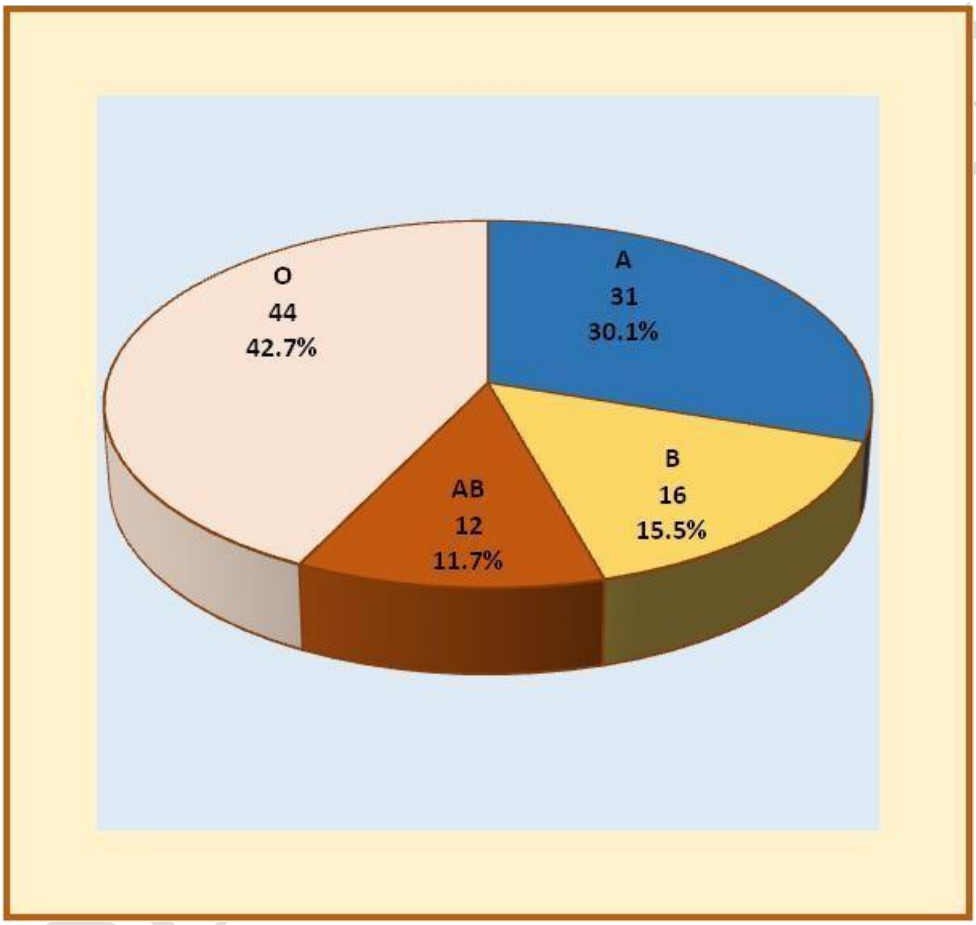

Figure2:Distributionofthestudypopulationaccordingto maternalblood group

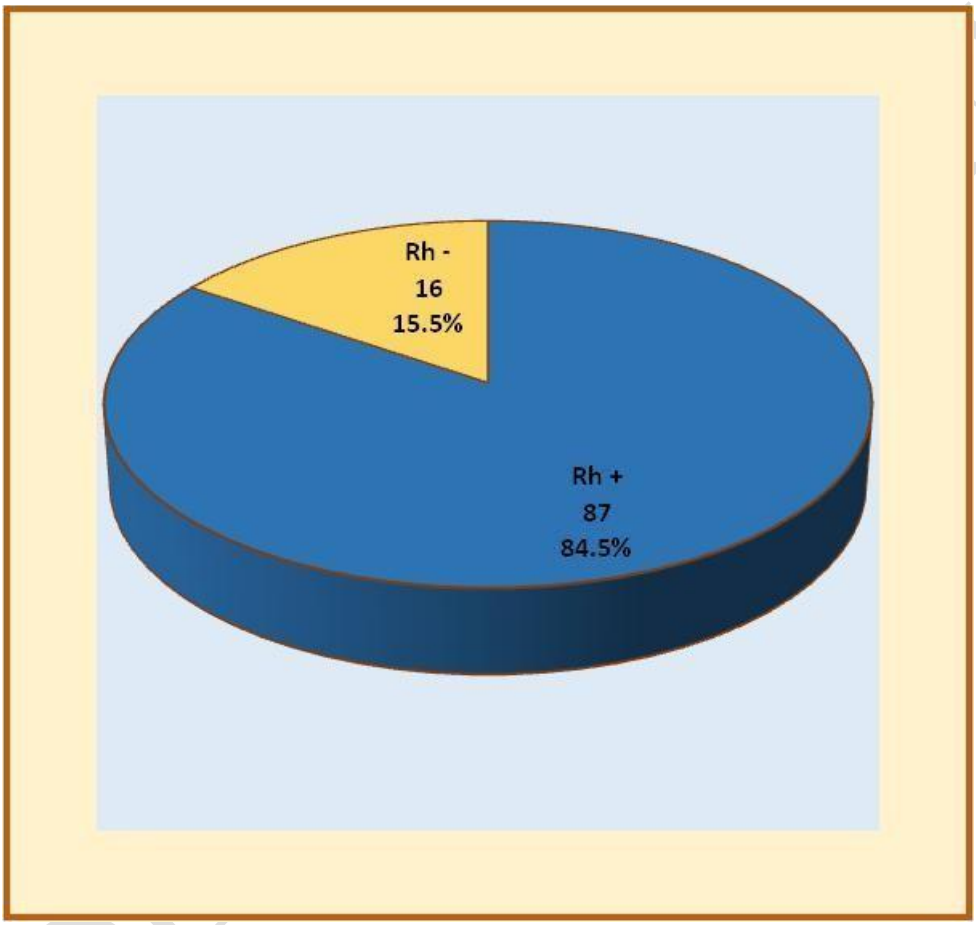

Figure3:Distributionofthestudypopulationaccordingto maternalRhstatus

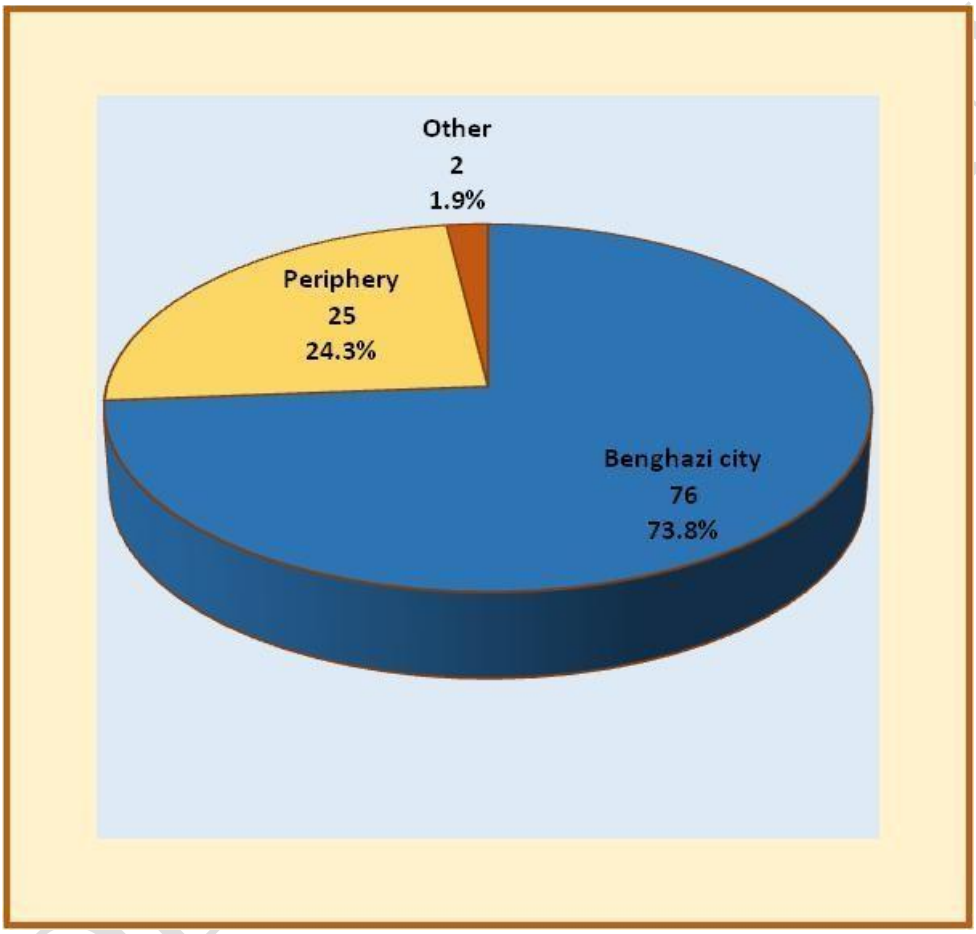

Figure4:Distributionofthestudypopulationaccordingtocoupleresidency

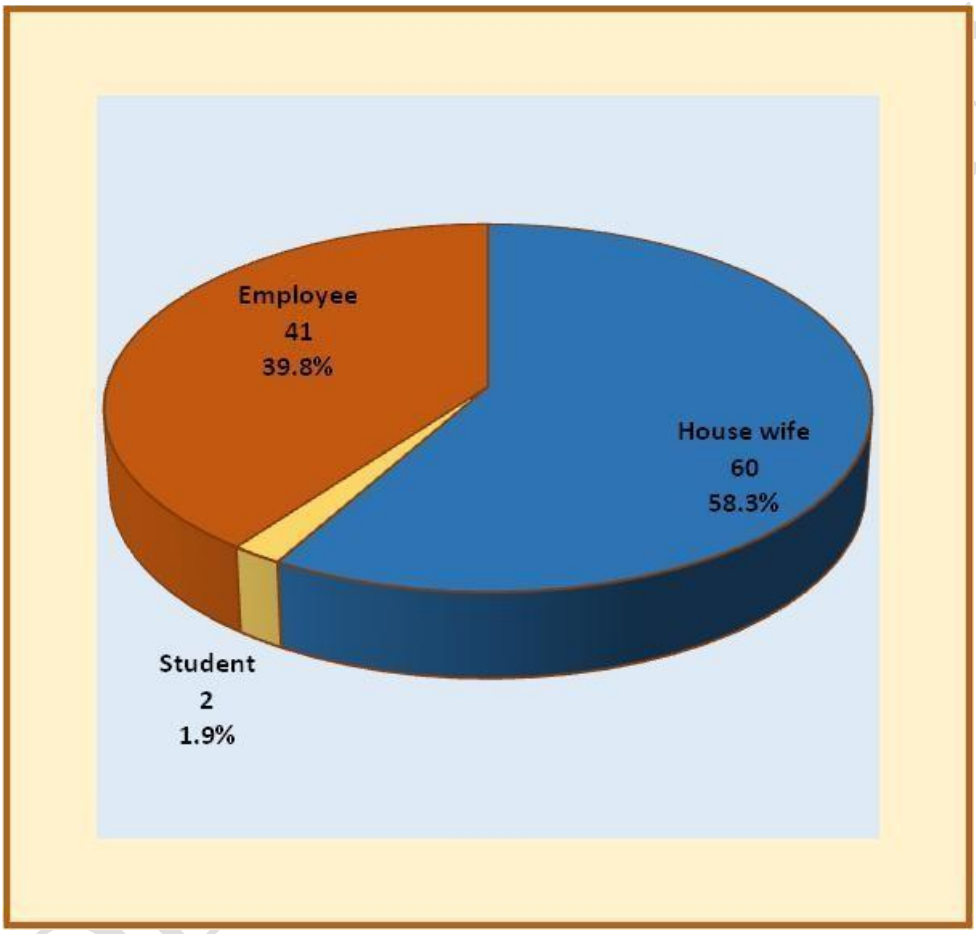

Figure5:Distributionofthestudypopulationaccordingto maternalworkstatus

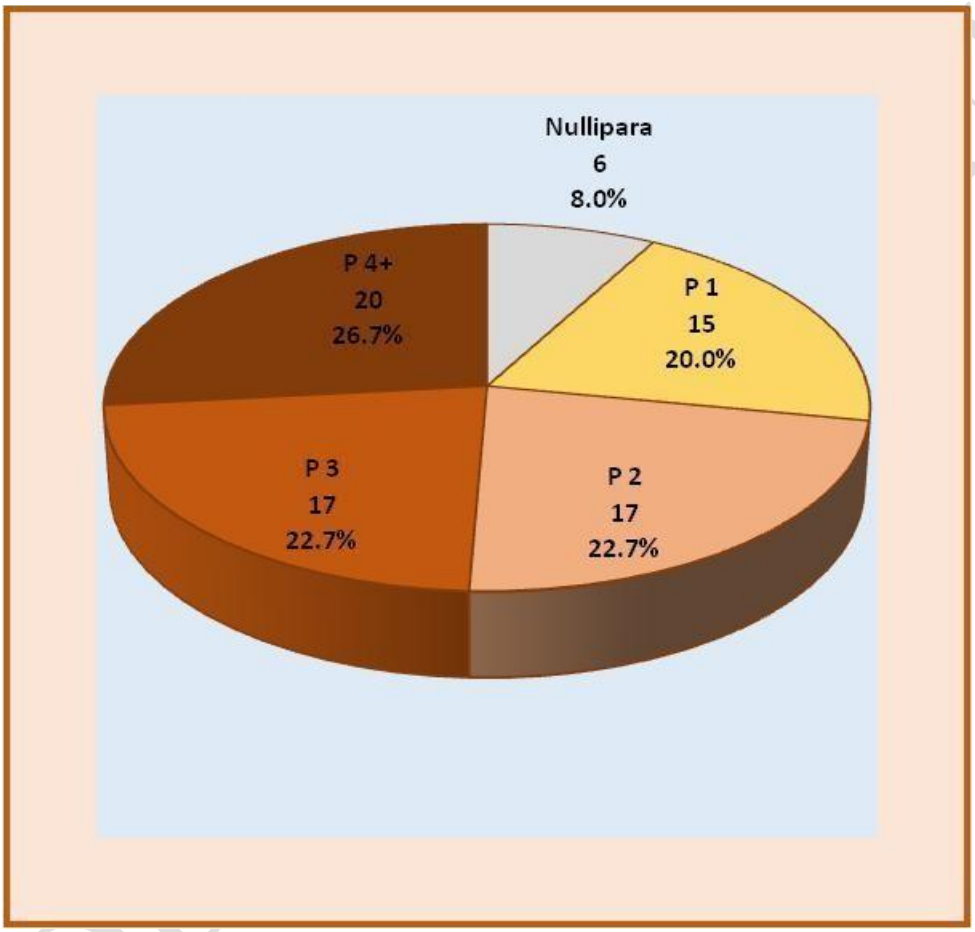

Figure6:Distributionofthestudypopulationaccordingtoparityof the mother

Parity: ranges0 –7,Mean ±SD3.09 ±1.788

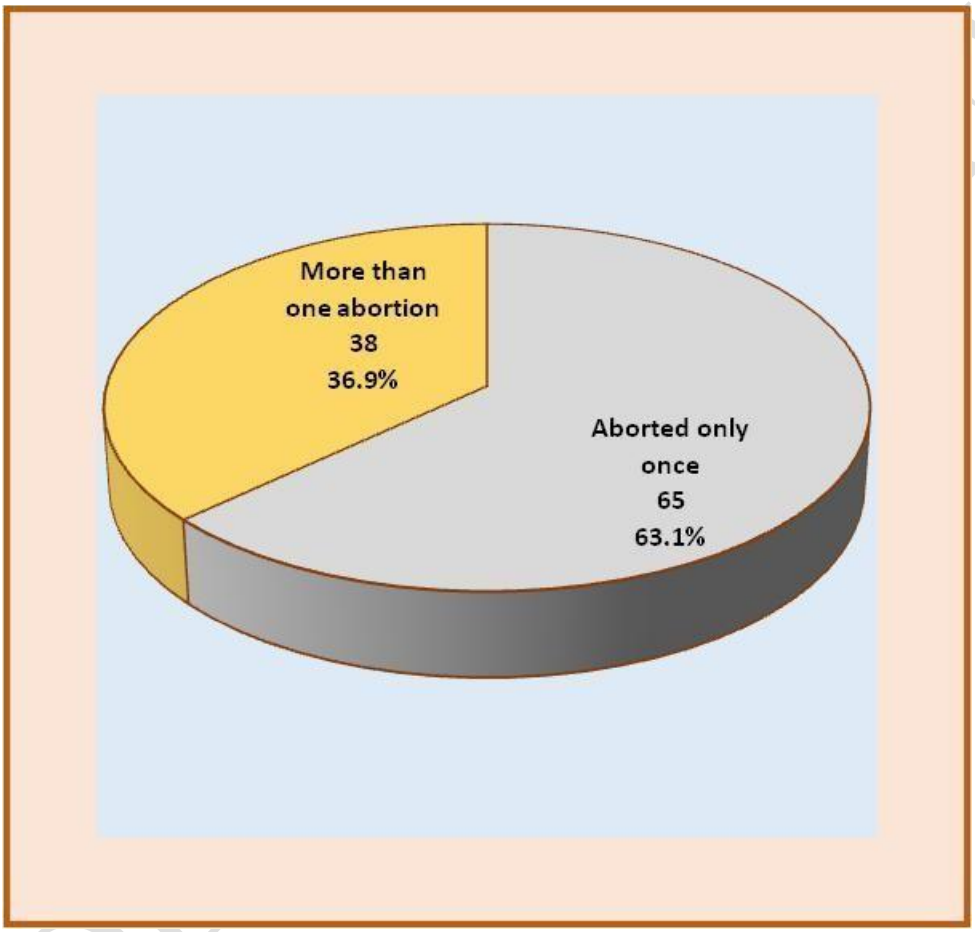

Figure7:Distributionof thestudypopulationaccordingtonumberofabortions
Abortions:ranges1 –7, Mean±SD 1.72±1.263

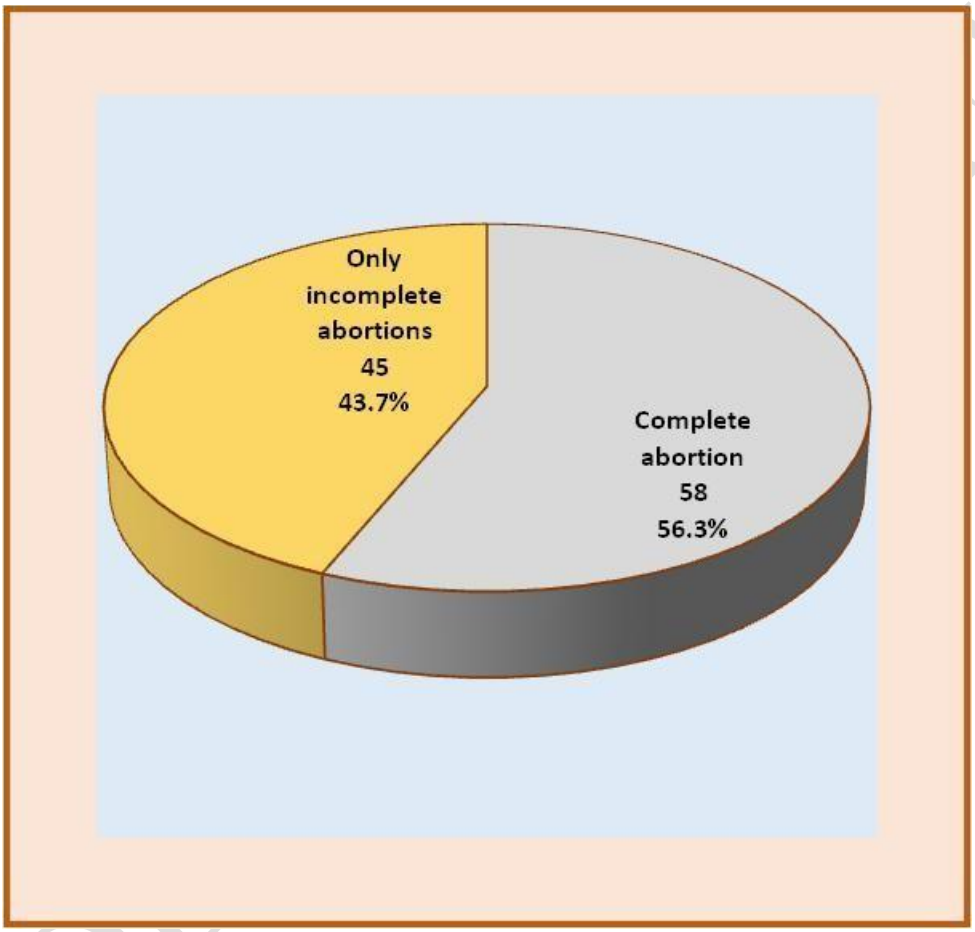

Figure8:Distributionofthestudypopulationaccordingtohistoryofincomplete abortion

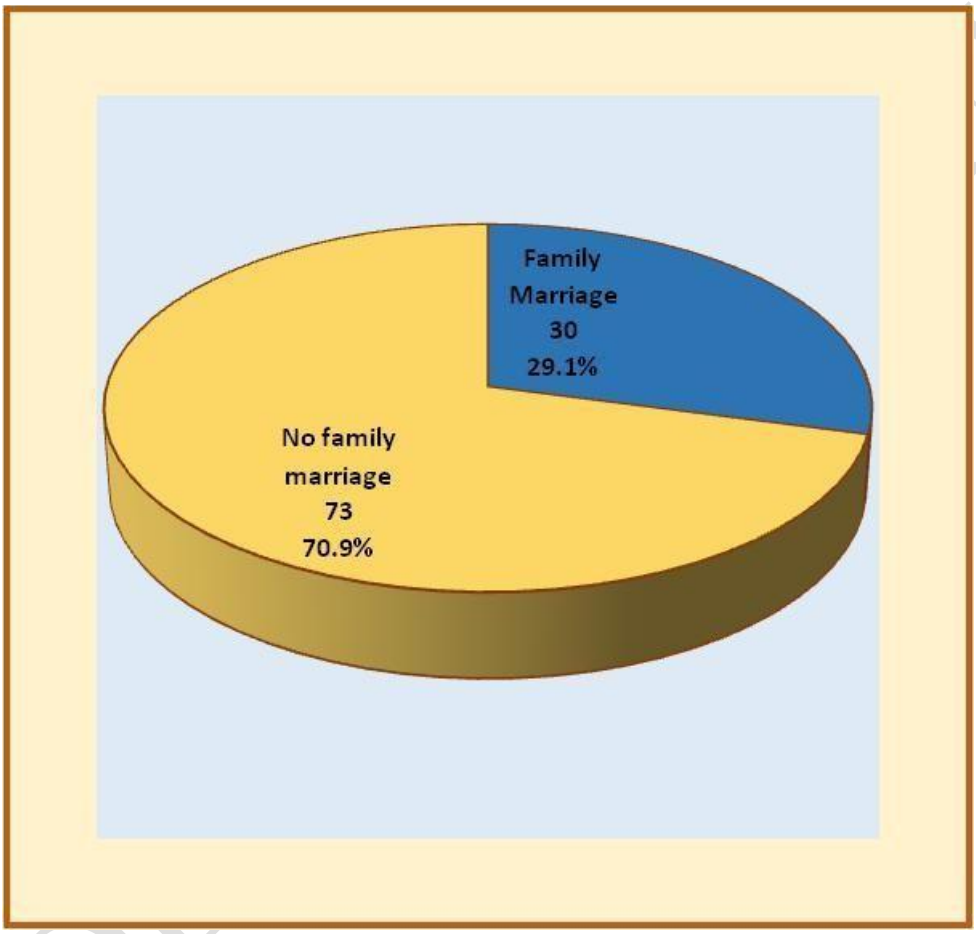

Figure9:Distributionofthestudypopulationaccordingtofamilymarriage

MaternalHealthcharacteristics:

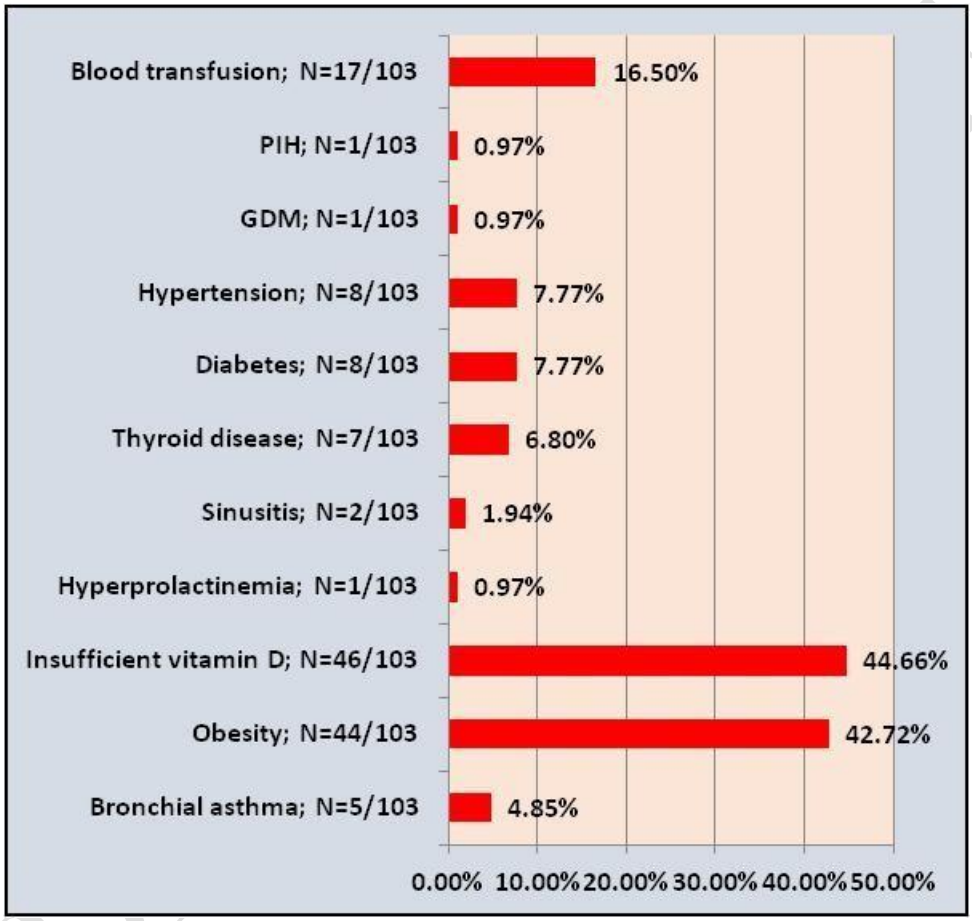

Figure 10: Rates of morbid conditions and past adverse events among the study population

PIH: pregnancy induced hypertension, GDM: Gestational diabetes, Insufficient Vitamin D: defined according to Institute of Medicine <20 ng/dL, Obesity: defined according to World HealthOrganization withbodymassindex≥30 kg/m ^{2},BMI: ranges18-53kg/m^{2}Mean ±SD29.65±5.762kg/m^2,Vitamin.D3:ranges4.0-98.0Mean±SD20.810±12.2512ng/ dL

Fatherrelatedcharacteristics:

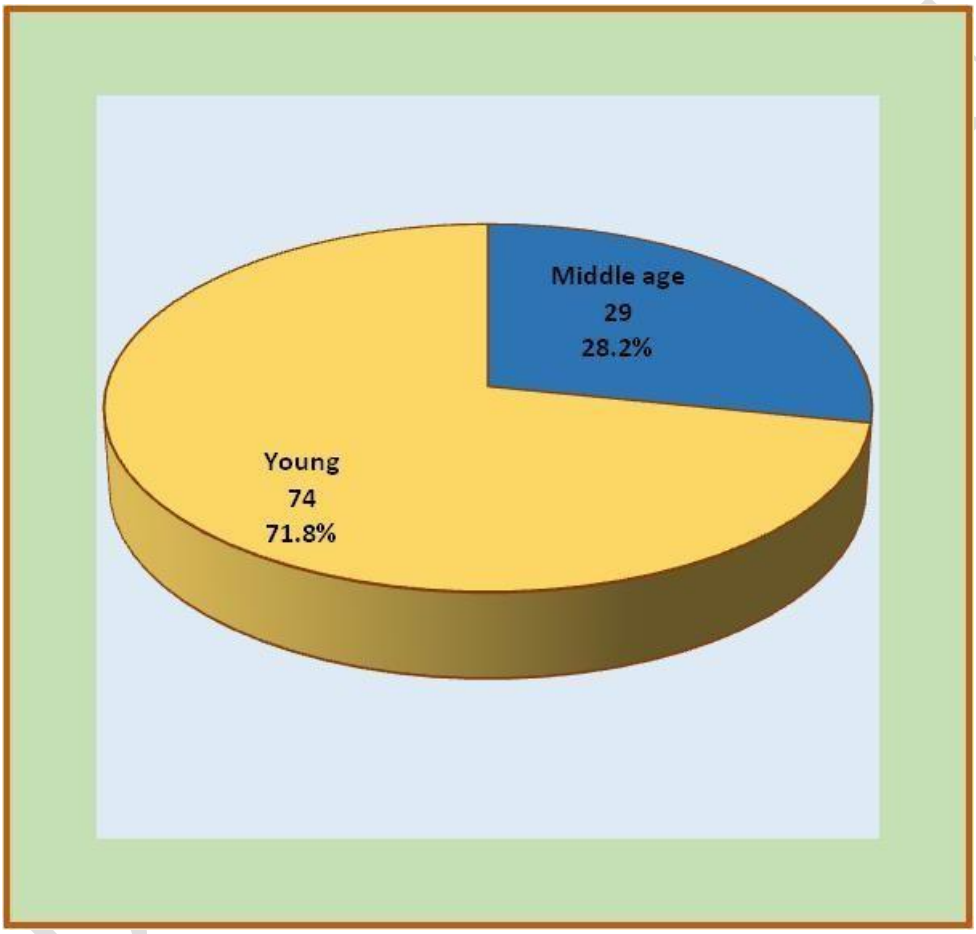

Figure11:Distributionof thestudypopulationaccordingtopaternalage

Middleage:45 –64years.FatherAge:ranges23–59,Mean±SD 39.95±6.465

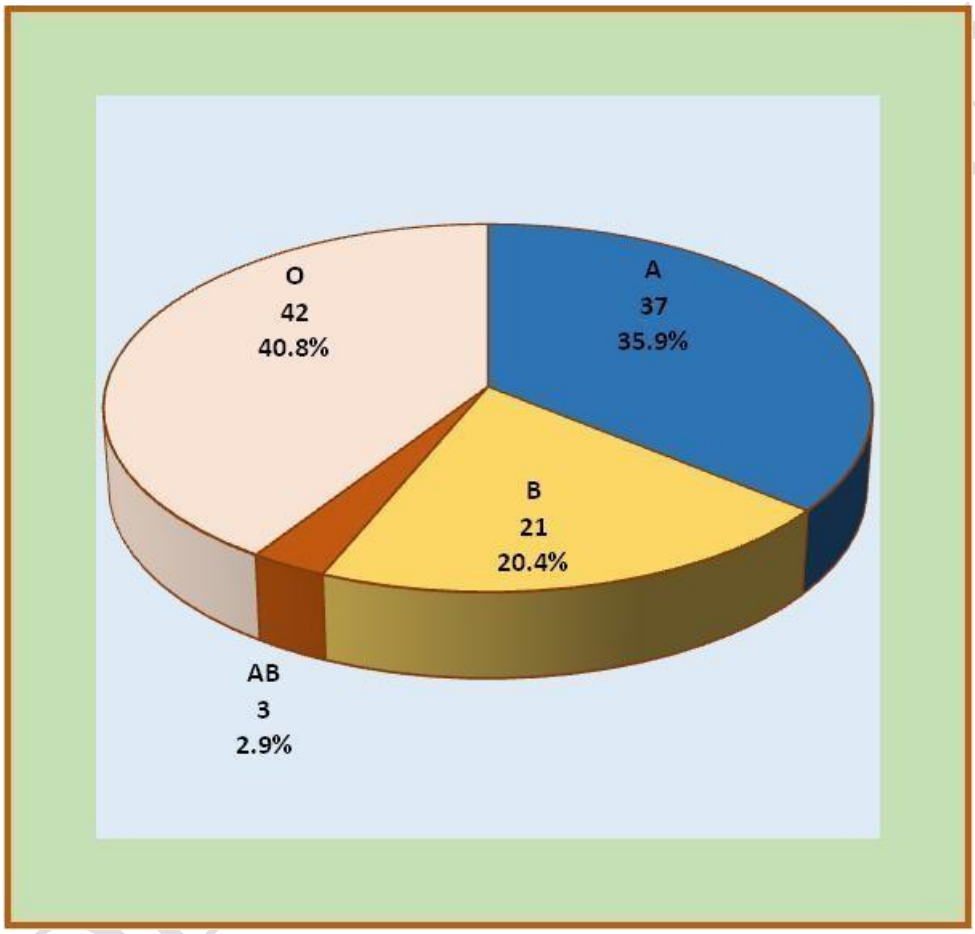

Figure12:Distributionof thestudypopulationaccordingtopaternalblood group

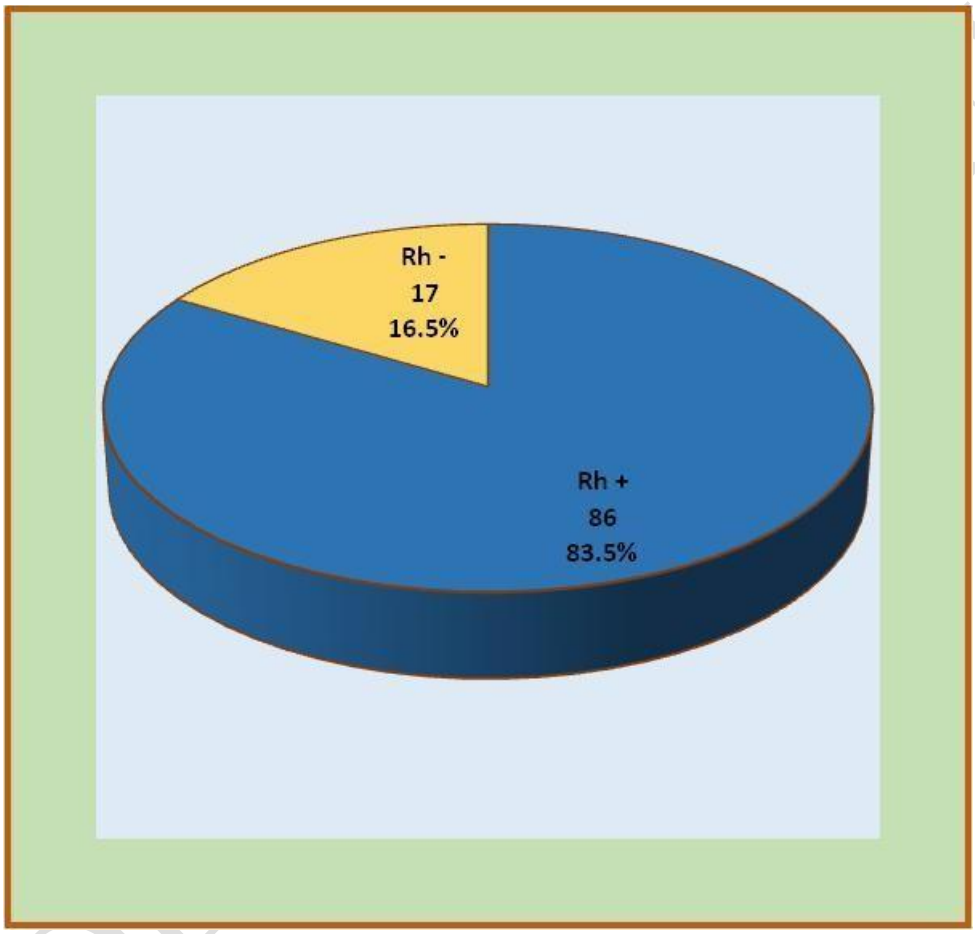

Figure13:Distributionof thestudypopulationaccordingtopaternal Rhstatus

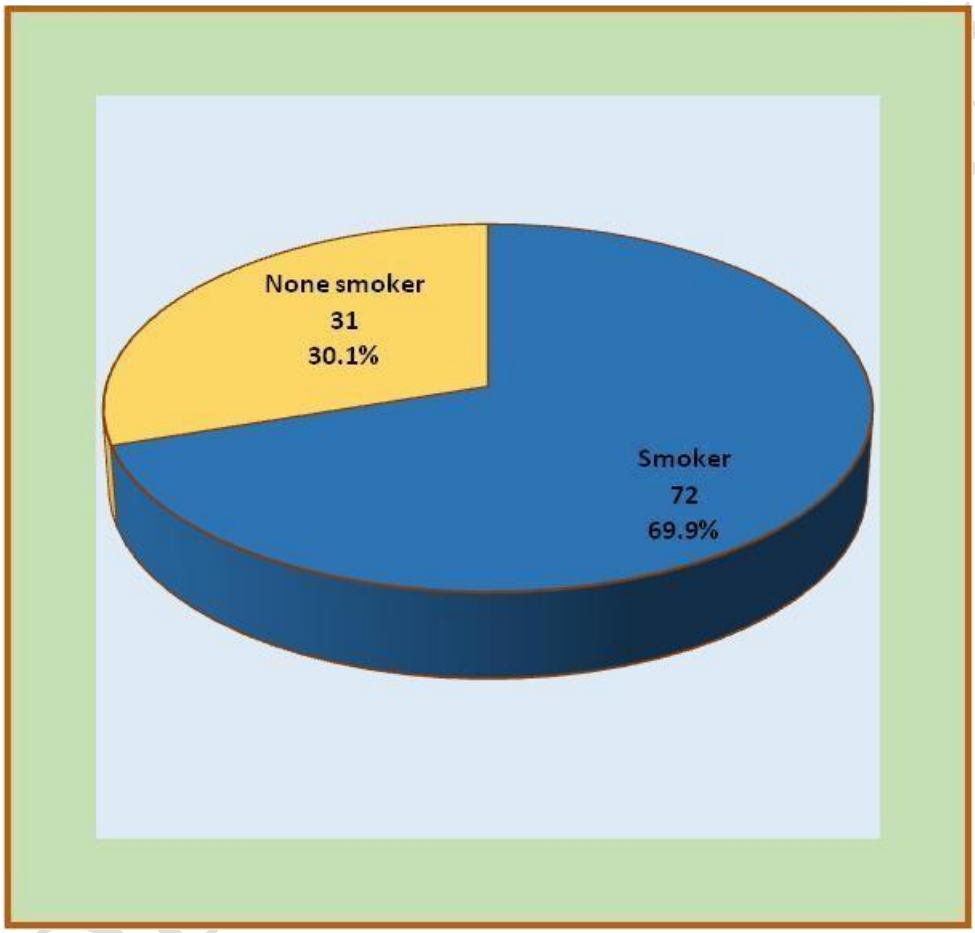

Figure14:Distributionof thestudypopulationaccordingtopaternalage

Thepregnancyoutcomesanalysis:
Maternaloutcomes:

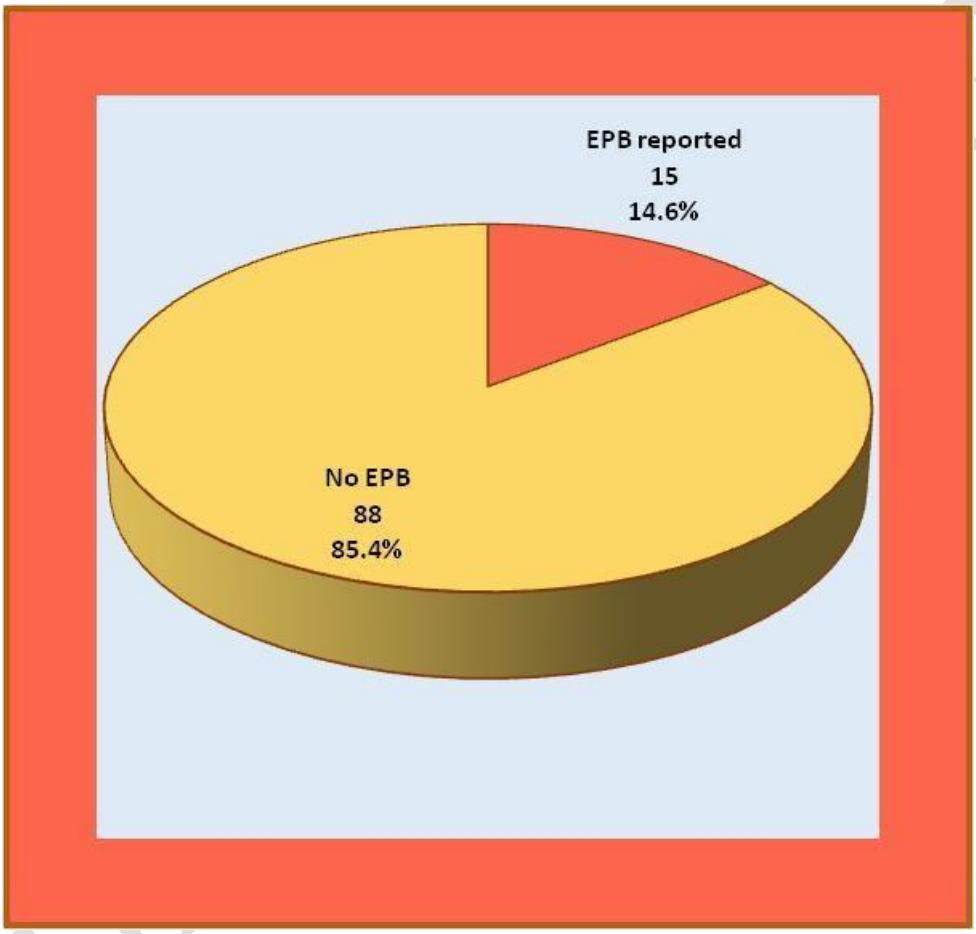

Figure 15: Distribution of the study population according to event of early pregnancy bleeding (EPB)

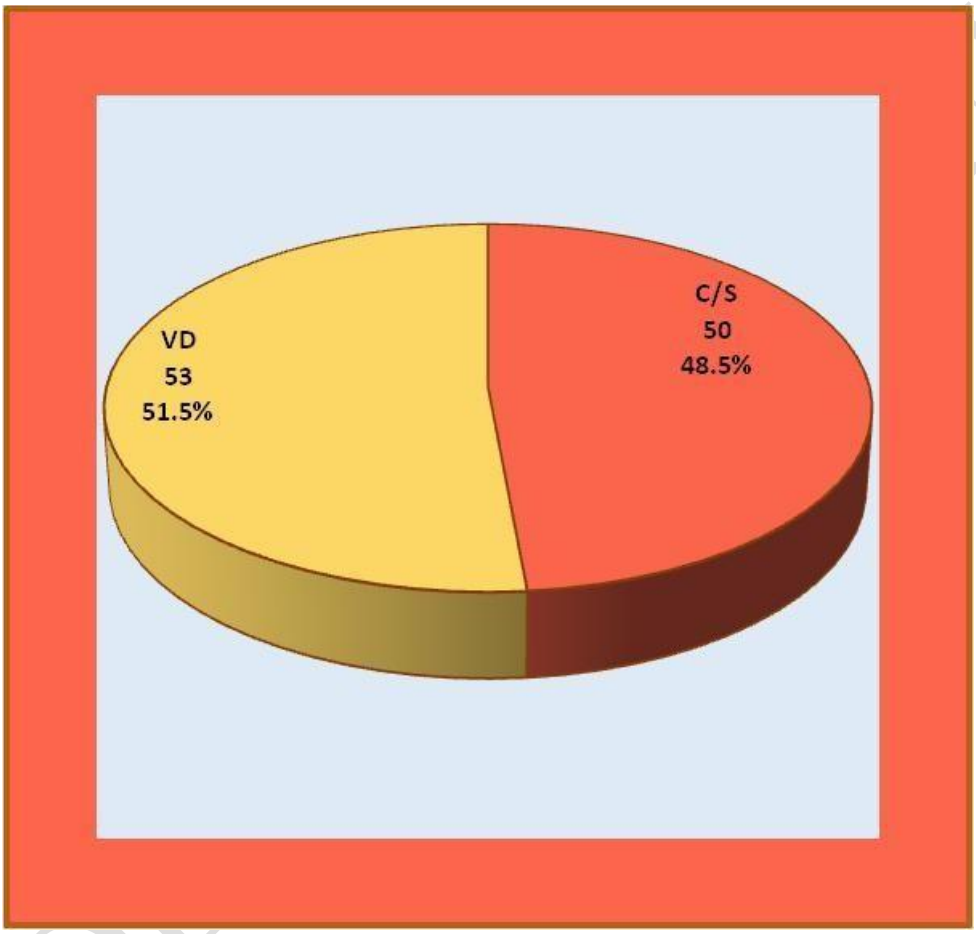

Figure16:Distributionofthestudypopulationaccordingtovaginaldelivery(VD) and caesarean section (C/S)

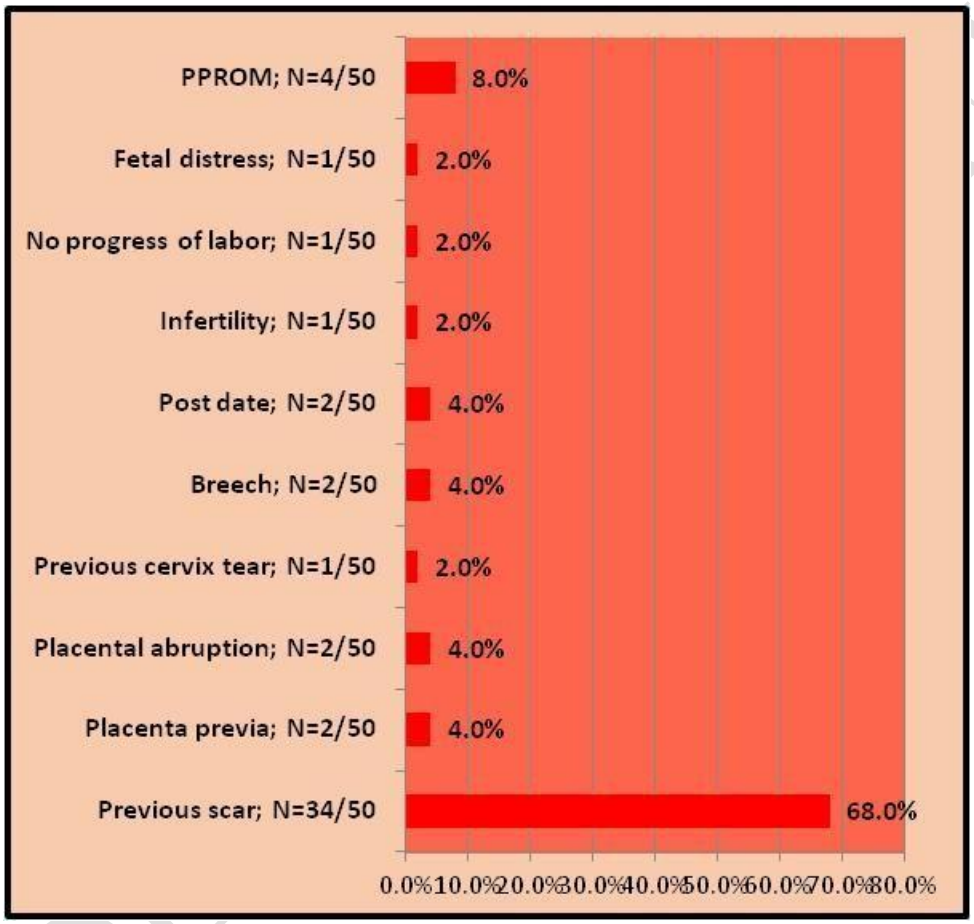

Figure17:Ratesofpregnancyoutcomes(indications)amongthestudypopulation delivered with caesarean section.

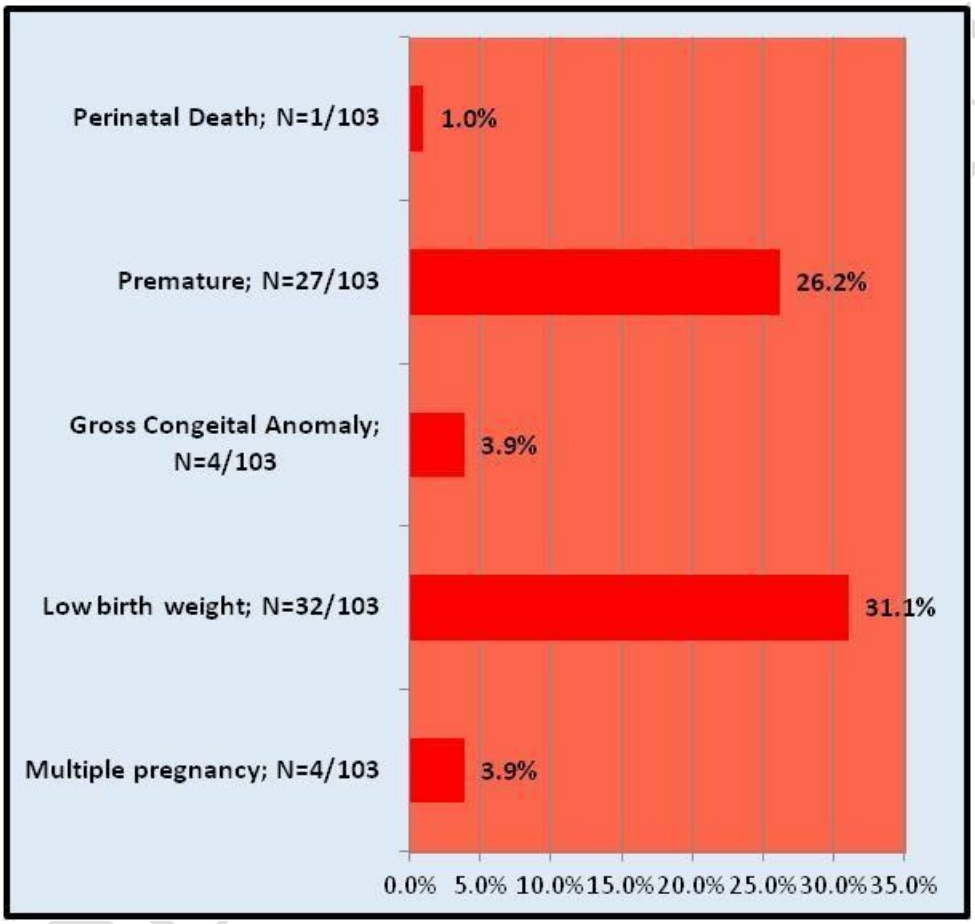

Figure18:Ratesofperinataloutcomesamongthestudypopulation

Low birth weight: <2.5 according to World Health Organization

Birth Weight: ranges0.60-4.53kg,Mean±SD2.9288±0.794kg

Table1:Demographicandenvironmentalfactorsandtheeventofearlypregnancy bleeding

Factor		Earlypregnancybleeding N %	*P*
Advancedmaternalage	Yes	8	0.688†
		16.0%	
	No	7	
		13.2%	
Middleage fathers	Yes	2	0.223‡
		6.9%	
	No	13	
		17.6%	
Low education	Yes	2	0.516‡
		9.1%	
	No	13	
		16.0%	
Working mother	Yes	7	0.557†
		17.1%	
	No	8	
		12.9%	
FamilyMarriage	Yes	2	0.220‡
		6.7%	
	No	13	
		17.8%	
Passive smoking	Yes	5	0.002* ‡
		6.9%	
	No	10	
		32.3%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. N:numberofcaseswithoutcomesoutofthosewithfactor.%:proportionofcaseswith outcomesamongthosewithfactorAdvancedmaternalage:≥35years.Loweducation: below secondary level. Middle age: 45 – 64 years.

Table2:Factorsof parityandabortionsandtheeventofearlypregnancybleeding

Factor		Earlypregnancybleeding N %	*P*
Parity0 to1	Yes	3	1.000‡
		14.3%	
	No	12	
		14.6%	
Abortionsmorethanone	Yes	5	0.757†
		13.2%	
	No	10	
		15.4%	
Incompleteabortions	Yes	6	0.755†
		13.3%	
	No	9	
		15.5%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. N:numberofcaseswithoutcomesoutofthosewithfactor.%:proportionofcaseswith outcomes among those with factor

Table3:Maternal morbidityfactorsandtheeventofearlypregnancybleeding

Factor		Earlypregnancybleeding N %	*P*
Common morbidity	Yes	1	0.063‡
		3.6%	
	No	14	
		18.7%	
Obesity	Yes	7	0.738†
		15.9%	
	No	8	
		13.6%	
InsufficientvitaminD	Yes	3	0.038†
		6.5%	
	No	12	
		21.1%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test.
N: number of cases with outcomes out of those with factor. %: proportion of cases with outcomes among those with factor Advanced maternal age: ≥35 years. Low education: below secondary level. Middle age: 45 – 64 years. Common morbidity: hypertension, diabetes, hypothyroidism, bronchial asthma, pregnancyinduced hypertension or gestational diabetes.Obesity:bodymassindex≥30.0kg/m^2.InsufficientserumvitaminD3:<20.0ng /dL

Table4:Demographicandenvironmentalfactorsandpregnancyoutcomes

Factor		Pregnancyoutcomes N %	*P*
Advancedmaternalage	Yes	6	0.647†
		12.0%	
	No	8	
		15.1%	
Middleage fathers	Yes	4	1.000‡
		13.8%	
	No	10	
		13.5%	
Low education	Yes	7	0.010*‡
		31.8%	
	No	7	
		8.6%	
Working mother	Yes	2	0.036*†
		4.9%	
	No	12	
		19.4%	
FamilyMarriage	Yes	4	1.000‡
		13.3%	
	No	10	
		13.7%	
Passive smoking	Yes	8	0.347‡
		11.1%	
	No	6	
		19.4%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Pregnancyoutcomes:Indicationsforcaesarean sectionrelatedonlytothecurrent pregnancy.Advancedmaternalage:≥35years.Loweducation:belowsecondarylevel. Middle age: 45 – 64 years.

Table5:Factorsofparityandabortionsandpregnancyoutcomes

Factor		Pregnancyoutcomes N %	*P*
Parity0 to1	Yes	14	1.000‡
		13.6%	
	No	3	
		14.3%	
Abortionsmorethanone	Yes	11	0.197†
		13.4%	
	No	3	
		7.9%	
Incompleteabortions	Yes	11	0.220†
		16.9%	
	No	4	
		8.9%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Pregnancyoutcomes:Indicationsforcaesarean sectionrelatedonlytothecurrent pregnancy.

Table6:Maternalmorbidityfactorsandpregnancyoutcomes

Factor		Pregnancyoutcomes N %	*P*
Common morbidity	Yes	10	1.000‡
		17.2%	
	No	4	
		14.3%	
Obesity	Yes	10	0.079†
		13.3%	
	No	9	
		20.5%	
InsufficientvitaminD	Yes	5	0.665†
		8.5%	
	No	7	
		15.2%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Pregnancyoutcomes:Indicationsforcaesarean sectionrelatedonlytothecurrent pregnancy. Advanced maternal age: ≥35 years. Low education: below secondary level. Middle age: 45 – 64 years. Common morbidity: hypertension, diabetes, hypothyroidism, bronchialasthma,pregnancyinducedhypertensionorgestationaldiabetes.Obesity:body mass index ≥30.0 kg/m ^{2}. Insufficient serum vitamin D3: < 20.0 ng /dL

Table7:Demographic andenvironmentalfactorsandlowbirthweight

Factor		Lowbirthweight N %	*P*
Advancedmaternalage	Yes	17	0.532†
		34.0%	
	No	15	
		28.3%	
Middleage fathers	Yes	9	0.996†
		31.0%	
	No	23	
		31.1%	
Low education	Yes	12	0.007*†
		54.5%	
	No	20	
		24.7%	
Working mother	Yes	15	0.325†
		36.6%	
	No	17	
		27.4%	
FamilyMarriage	Yes	9	0.881†
		30.0%	
	No	23	
		31.5%	
Passive smoking	Yes	26	0.092†
		36.1%	
	No	6	
		19.4%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Lowbirthweight:birthweight<2.5kg.Advancedmaternalage: ≥35 years.Low education: below secondary level. Middle age: 45 – 64 years.

Table8:Factorsof parityandabortionsandlow birth weight

Factor		Lowbirthweight N %	*P*
Parity0 to1	Yes	11	0.018*
		52.4%	
	No	21	
		25.6%	
Abortionsmorethanone	Yes	11	0.722†
		28.9%	
	No	21	
		32.3%	
Incompleteabortions	Yes	18	0.084†
		40.0%	
	No	14	
		24.1%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Lowbirthweight:birthweight<2.5kg.

Table9:Maternal morbidityfactorsandlowbirthweight

Factor		Lowbirthweight N %	*P*
Common morbidity	Yes	32	0.271†
		31.1%	
	No	11	
		39.3%	
Obesity	Yes	21	0.887†
		28.0%	
	No	14	
		31.8%	
InsufficientvitaminD	Yes	18	0.112†
		30.5%	
	No	18	
		39.1%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test.
Low birth weight: birth weight < 2.5 kg. Common morbidity: hypertension, diabetes, hypothyroidism,bronchialasthma,pregnancyinducedhypertensionorgestationaldiabetes. Obesity: body mass index ≥30.0 kg/m ^{2}. Insufficient serum vitamin D3: < 20.0 ng /dL

Table10:Demographic andenvironmentalfactorsandthe prematurity

Factor		Prematurity N %	*P*
Advancedmaternalage	Yes	13	0.962†
		26.0%	
	No	14	
		26.4%	
Middleage fathers	Yes	7	0.764†
		24.1%	
	No	20	
		27.0%	
Low education	Yes	10	0.021*†
		45.5%	
	No	17	
		21.0%	
Working mother	Yes	13	0.303†
		31.7%	
	No	14	
		22.6%	
FamilyMarriage	Yes	7	0.670†
		23.3%	
	No	20	
		27.4%	
Passive smoking	Yes	17	0.360†
		23.6%	
	No	10	
		32.3%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Prematurity:birthatgestationalage<259days.Advancedmaternalage: ≥35years.Low education: below secondary level. Middle age: 45 – 64 years.

Table11:Factorsof parityandabortionsandthe prematurity

Factor		Prematurity N %	*P*
Parity0 to1	Yes	7	0.406†
		33.3%	
	No	20	
		24.4%	
Abortionsmorethanone	Yes	11	0.630†
		28.9%	
	No	16	
		24.6%	
Incompleteabortions	Yes	14	0.319†
		31.1%	
	No	13	
		22.4%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test.
Prematurity:birthat gestationalage<259days.

Table12:Maternalmorbidityfactorsandtheprematurity

Factor		Prematurity N %	*P*
Common morbidity	Yes	12	0.019*†
		42.9%	
	No	15	
		20.0%	
Obesity	Yes	13	0.507†
		29.5%	
	No	14	
		23.7%	
InsufficientvitaminD	Yes	13	0.671†
		28.3%	
	No	14	
		24.6%	

*Significantatlevelofconfidenceof95%. †Pearson'sChisquaretest. ‡Fisher'sexact test. Prematurity: birth at gestational age < 259 days. Common morbidity: hypertension, diabetes, hypothyroidism, bronchial asthma, pregnancyinduced hypertension or gestational diabetes.Obesity:bodymassindex≥30.0kg/m^2.InsufficientserumvitaminD3:<20.0ng /dL

DISCUSSION

The study included 103 mothers undergone child birth in Benghazi medical center and they had a previousmedical history of miscarriage.

Mean age of mothers with was 34.30(Std. Deviation 6.018) years, with age ranged from 21to 47 years, maternal BMI ranged from 18.4 to 52.7 kg/ m^2andmean29.654kg/m^2±SD5.7627.30.1%ofmothershadBMI30-34.9kg/m^2,6.8%hadBMI35-39.9kg/m^2where63.1%ofstudymembershad BMI =>40kg/m^2, the last one classified as Class III (high-risk) obesity, that may involve in the biases for this study as we know and well established by evidence-based facts that the obesityspeciallythe sever one (class II,class III) has a major role in development of many of obstetrics complications as an independent risk factor. [22]

The mean offather age 39.95years +/- 6.465 minimum age 23 years and maximum age was 59 years. most of study members their hemoglobin level range(minimum 10.4g/dland maximum11.6g/dl) +/-1.46, vitD range minimum 4 ng/mL and maximum 98 ng/mL+/-12.25 SD.

Regarding ABO blood type, the mothers blood groups distributed as followingA^+24.3%,A^-7.8%, AB^+11.7%,B^+13.6%,O^-6.8%, O^+35.9%wherethe father blood group distribution A^+ 32%, A^- 3.9%, AB^+ 2.9%, B^- 6.8%, B^+13.6%, O^-4.9%, O^+35.9%, the significance ofthat according toFranchini M et al (2016) [23].

Systematic literature analysis was only related to pre-eclamptic disorders which was infrequent in this study[23].

Mother education in our study as following, preparatory 4.9%, primary 12.6%, secondary 50.5%, university 32%. In David A. Savitz, et (POVERTY,EDUCATION,RACE,ANDPREGNANCYOUTCOME)[24].

The association between education and preterm birth by race differed in the area population, compared to study participants. Among area African-American women, more education was predictive of lower risk, whereas among study participants, little difference was observed in relation to education. Among White women, both in the area and among PINparticipants, there was a clear inverse gradient for risk of preterm birth with advancing education. For White women, a similar inverse risk gradient for SGA was observed in both study participants and women residing in the area. Among African American women in the area, there was a clear inverse gradient in risk of SGA with rising education; however, that pattern was not nearlyaspronouncedamongPINparticipants,duetoananomalousabsenceof high risk in the lowest education group. Considering poverty index and education jointly among PIN participants, White participants who were disadvantaged on both (low income and ,12 years education) were at greatest risk for preterm delivery (21.3%). Among Whites, being poor was associated with increased risk for SGA births, regardless of education. in our study the education level show no significant association {p-value 0. 092}, but with comparing to the association between level of education and spacing p=0.049 statistically significant,as well as mother educationand family marriage p=0.049.

Regarding maternal occupation during pregnancy, in concordance with th present study, Casas M et al (2015) [25]employees had a lower risk ofpreterm delivery than non-employees [adjusted odds ratio (OR adj) 0.86, 95% confidence interval (95% CI) 0.81–0.91]. working in most of the occupational sectors studied was not associated with adverse birth outcomes, this study suggeststhat,overall,employmentduringpregnancyisassociatedwitha

reduction in the risk of pretermbirth and that work in certain occupations may affect pregnancy outcomes. This exploratory study provides an important platform on which to base further prospective studies focused on the potential consequences of maternal occupational exposures during pregnancy on child development[25]. in our study we classified the mothers as employee 39.8% and housewife60.2%, the results as following mother occupation and antenatal booking early not statistically significant p=0.065,mother occupation and spacing p=0. 076 not significant, mother occupation and family marriage p=0.104 not significant.

With respect to living place mothers divided into 2 groupslive in Benghazi (2nd city in Libya) 73.8% and out Benghazi 26.2%, 84.2% of Benghazi members attend early booking clinic compering to 63.0% of other group with p= 0.021, around 67.1% of 1st group had a pregnancy spacing compering to 2nd only 40.7% only attend early booking with p= 0.016.

C Oliver-Williams…. etc[26] previous miscarriage was associated with an increased risk of all-cause preterm birth (adjusted odds ratio, aOR 1.26; 95% confidence interval, 95% CI 1.22–1.29). This arose from associations with all subtypes. The strongest association was found with extreme preterm birth (aOR 1.73; 95% CI 1.57–1.90). Risk increased with the number of miscarriages. Women with three or more miscarriages had the greatest risk of all-cause preterm birth (aOR 2.14; 95% CI 1.93– 2.38), and the strongest association was with extreme preterm birth (aOR 3.87; 95% CI 2.85–5.26). The strength of the association between miscarriage and preterm birth decreased from 1980 to 2008.[26]with us in this study we show that 28.2% of participateshadpretermdeliverywhere71.8%hadtermone.50.5%gave

delivery by cesarean section comparing to 43.7% gave vaginal delivery that mode of delivery regardless the gestational age (term vs preterm). According to Ali N et al (2020) [27]**;** women with a history of recurrent miscarriage (RM) were twice as likely to undergo cesarean section and seven times more likely to deliver prior to 32 weeks of gestation than womenwithout a history of recurrent miscarriage, history of RM had independently significant increased odds of cesarean section (adjusted odds ratio (aOR)1.81, 95%CI1.24–2.65)andpreterm(<37weeks,aOR:2.52,95%CI1.56–4.08)
or very preterm delivery (< 32 weeks, aOR: 7.02 95% CI 2.41– 20.46) in subsequent pregnancies than women who did not have a history of RM[27].

According to Dempsey JC et al (2003) [29] women, both with ahistory of abortion and without, experienced decreases of 60% (adjusted OR = 0.40,95% CI .23-.71) and 71% (adjusted OR = .29, 95% CI .16-.53), respectively, in risk of preeclampsia when compared to nulliparous women with no history of abortion. Type (spontaneous and/or induced), number and timing of prior abortion did not appear to influence the risk of preeclampsia among nulliparous women.[29] regarding that only one participate in our study developed preeclampsia and no one developed eclampsia.

AccordingtoRCOG(2011)inGreen-topGuidelineNo.17
Previous reproductive history is an independent predictor of future pregnancy outcome.The risk of a further miscarriage increases after each successive pregnancyloss,reachapproximately40%afterthreeconsecutivepregnancy losses, and the prognosis worsens with increasing maternal age. A previous livebirthdoesnotpreclude awoman developing recurrent miscarriage. With us around 9 participants their pregnancies end withmiscarriage[30].

According to Momo RJ et al (2019) [31] independent risk factors for : Intrauterine fetal death (IUFD) are age over 30 years (ORa = 2.1, P = 0.052), (ORa = 2.4497, p = 0.01), household occupation (ORa = 2.0097, p = 0.0282), hypertension disorders (ORa = 2.11, p = 0.0176), antepartalhaemorrhage (ORa=3.9635,p=0.000),multiparity(ORa=13.3089,p =0.0056),Themain risk factors for IUFD identified in our study are maternal age greater than 30 years, hypertension, antepartumhemorrhage, multiparity, and the household profession. Any pregnant woman who has one of these factors should be follow-up closely during pregnancy with a weekly assessment of fetal well-being by the 28th week[31]. that support our results as miscarriage is n't an independent risk factor for IUFD.

According to Hasan R et al (2009) [32]Heavy bleeding in the first trimester, particularly when accompanied by pain, is associated with higher risk of miscarriage. Spotting and light episodes are not, especially if only lasting 1–2 days.[32], around 15participants in this study developed vaginal bleeding in first trimester without significant impact on pregnancy outcome.

Lower maternal education (below secondary) was associated with higher level of pregnancy adverse outcomes warranting caesarean delivery (31.8% for 8.6%).

Lower maternal education and low parity (0,1) were foundsignificantly associated with low birth weight (54.5% for 24.7% and 52.4%for 24.1%)

Lower maternal education (below secondary) and the presence of commonco-morbidcondition(hypertension,diabetesorthyroiddisorder)

were associated withsignificantincrease in prematurity(45.5%for 21.0% and 42.9% for 20.0%).

Limitations in the current study included poor reporting or missing in registering some parameters and the lack of some important laboratory testing for inflammation. Another stronger design study is warranted.

6.ConclusionandFutureRecommendations

6.1. Conclusion:

Mothers with history of previous abortion shows a rate of caesarean delivery of 48.5%, early pregnancy bleeding of 14.6% prematurity of 26.2%, and low birth weight of 31.1%. number of previous abortions and parity seem not affecting outcomes but maternal age, education and comorbid conditions.

6.2. Recommendations:

1. Multicenterprospectivestudytoverifypredictorsofoutcomesamongwomen with previous miscarriage.
2. Planningforpregnancyanddeliverywithgoodmonitoringandcarefor mothers with previous abortions.

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