SJIF Impact Factor: 6.711

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 9
Issue: 10
Page N. 86-91
Year: 2025

Original Article www.wjahr.com

# RISK FACTORS OF ABORTION AMONG MULTIPAROUS WOMEN IN MOSUL CITY

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**Article Received date:** 24 July 2025 **Article Revised date:** 13 August 2025 **Article Accepted date:** 02 September 2025

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**DOI:** https://doi.org/10.5281/zenodo.17223453

## ABSTRACT

**Background:** Abortion is the force or spontaneous removal of an embryo or fetus before it achieves a stable phase of life. Assessing abortion risk factors helps pinpoint areas for improvement in health care for pregnant women, particularly those who are at high risk for having an abortion. **Aim of the study:** Determine the risk factors of abortion among multiparous women and to suggest some methods for controlling certain risk factors if possible. **Patients and Methods:** A case-control study was conducted in Mosul teaching hospitals for obstetrics and gynecology including a total of 300 pregnant women; 150 cases and 150 controls multiparous women with a documented pregnancy by pregnancy test and/or ultrasonography presented with any type of abortion. **Results:** A significant positive relationship was recorded between the age group of (36-40), (>40), and abortion in multiparous women. In terms of gravidity, most cases were pregnant five or more times, while most of the controls were pregnant three times. For history of previous abortion most cases had two or more abortions, while most controls did not have any previous abortion. The inter-pregnancy interval observed in most cases had less than one year, while most of controls had more than or equal to one year. Regarding outcomes, most cases lost their child while most controls had successful delivery, In terms of antenatal care, most cases visited the hospital 1-4 times while most controls visited more than or equal to 4 times. Most cases had a history of bleeding, while most controls did not have that. Most cases were with a gestational age less than 13 weeks while all the controls were with a gestational age more than or equal to 13 weeks (100%). 49.3 % of the cases had trauma followed by fever, TORCH, drug and anti- phospholipid syndrome while most controls had a fever (6.7%) followed by drug, anti- phospholipid syndrome and trauma. **Conclusion:** Study showed that increased gravidity and parity, short inter-pregnancy interval, bad previous obstetrical history, previous fetal congenital malformations, medical illnesses and advanced age are all linked with increased risk of miscarriage among multiparous women.

**KEYWORDS:** Abortion, Risk Factors, Mosul, Multiparous.

## INTRODUCTION

Abortion, which is the force or spontaneous removal of an embryo or fetus before it achieves a stable phase of life, is a common pregnancy result particularly in the first trimester (before the 12th week of pregnancy).[1] The phrase "miscarriage " refers to spontaneous abortion, which accounts for up to 20% of all known pregnancies and is the loss of pregnancy without external interference.[2] There are four stages of spontaneous abortion: threatened, unavoidable, incomplete and finally complete.[3]

The following are typical risk factors for miscarriage:[4]

1. Age, older women have a larger chance of miscarriage
2. Previous abortion
3. Medical problem that already existed
4. Anomalies in the reproductive system's anatomy
5. Alcohol, marijuana and smoking
6. Obesity; BMI>25
7. Invasive perinatal procedures

Assessing abortion risk factors helps pinpoint areas for improvement in health care for pregnant women, particularly those who are at high risk for having an abortion.[5]

### Types of abortion

1. Threatened abortion: vaginal bleeding before 20 weeks of gestation with positive urine and/or blood pregnancy test, a closed cervical os, no signs of fetal or embryonic death and no passage of production of conception.[6]
2. Inevitable abortion: refers to a pregnancy that has progressed to the point where the cervix has dilated with heavy vaginal bleeding.[7]
3. Incomplete abortion: bleeding, cervical dilation and expulsion of pregnancy by-products. As evidenced

by ultrasound, at least some of the embryos and fetuses are still developing inside the uterus.[8]
4. Complete abortion: the ultrasound images clearly show that the uterus is empty.
5. Missed abortion: without spontaneous abortion, a pregnancy that cannot survive inside the uterus is considered to have been "missed".[9]
6. Septic abortion: a miscarriage that occurs because of an infection within the uterus.
7. Induced abortion: medical or surgical termination of pregnancy performed before the baby is viable as a preventive measure for the mother's health.[10]
8. Habitual abortion (recurrent miscarriages): defined as three recurrent miscarriages in the first trimester.[11]

## AIM AND OBJECTIVES

To determine the risk factors of abortion among multiparous women

Objectives:

1. To find the association between maternal age, parity, gravidity and abortion.
2. To determine the association between the outcome of the previous and current pregnancy.
3. To suggest some methods for controlling of certain risk factors of abortion if possible.

## PATIENTS AND METHODS

A hospital-based case-control study was conducted with a direct interview with cases and controls for collection of information regarding the exposure to certain risk factors of abortion during pregnancy by using a special questionnaire form and accordingly both cases and controls were divided into an exposed group ( have risk factor ) and non-exposed group (didn't have risk factor).

The case-control study which typically assesses the association between risk factors and occurrence of a disease is simple, quick, relatively inexpensive and require a small sample, however recall bias is one of its advantages which means difficulties in remembering past event to be recorded as a risk factor and as a pregnant women were asked about the recent event during current pregnancy, this help to overcome recall bias.[12]

The study was conducted in Mosul teaching hospitals for obstetrics and gynecology; Al- Batool Teaching Hospital for obstetrics and gynecology, Al-Khansaa Teaching Hospital for obstetrics and gynecology and Al-Salam General Teaching Hospital over a period of seven months from January 2022 to the end of July 2022.

A total of 300 pregnant women had been collected; 150 cases (with documentation of pregnancy either by pregnancy test or by ultrasonography) and 150 controls.

Case definition: Multiparous pregnant women who just lost or may lose their fetuses prior to or at 20 weeks of gestation attending Mosul teaching hospitals of obstetrics and gynecology during the study period.

Criteria for cases selection (Inclusion criteria): Multiparous women with a documented pregnancy by pregnancy test and/or ultrasonography presented with any type of abortion.

Exclusion criteria:

- Pregnant women with ectopic pregnancy
- Pregnant women with hydatiform pregnancy
- Women with a twin pregnancy
- Primiparous women
- Nulliparous women

Control definition: multiparous pregnant women who just delivered a live full-term baby attended Mosul teaching hospitals for obstetrics and gynecology during study period.

Criteria for control selection: a multiparous pregnant woman who delivered a full-term baby which means delivery of an infant after 37 weeks of gestation and the newly delivered babies are free from any gross congenital anomalies and had been discharged well from neonatal care unit and received by their mothers.

Exclusion criteria from control:

- Pregnant women with premature delivery (delivery before 37 weeks gestation)
- Pregnant women who delivered a baby with congenital abnormalities
- Pregnant women who delivered a baby kept in the neonatal care unit
- Pregnant women who just delivered her 1$^{st}$ baby

Statistical calculations were done using Statistical Package for the Social Sciences version 26 (SPSS Inc.) in which categorical data were expressed as numbers and percentages. The differences between the groups were analyzed using the Chi-square test ($X^2$). The prediction ability of the significant variables were assessed using a binary logistic regression test in which the odds ratio and coefficient value were calculated. The Goodness of fit was used to assess the data fitness for the test. A confidence interval of 95% was applied as the dependent interval in statistics and P-values < 0.05 were accepted as statistically significant.

An official agreement was obtained from directorate of health in Mosul city to perform this study. A verbal patient consent to participate in this research had been obtained from each patient.

## RESULTS

**General demographical data distribution among studied groups.**

| Variables | | Cases (No.150) | Controls (150) | $X^2$ | P- Value | Odd Ratio | 95% CI |
|---|---|---|---|---|---|---|---|
| Educational level | Illiterate | 98(65.33%) | 21(14.0%) | 96.15 | <0.001 | 6.467* | 1.87-22.36 |
| | Primary education | 32(21.33%) | 112(74.7%) | | | 0.388 | 0.115-1.305 |
| | Higher education | 15(10.0%) | 10(6.6%) | | | 2.100 | 0.518-8.508 |
| | University | 5(3.33%) | 7(4.7%) | | | 0.004 | 0.001-0.987 |
| Occupation | Employee | 13(8.67%) | 8(5.3%) | 0.91 | 0.338 | 1.566 | 0.621-3.95 |
| | Housewife | 137(91.33%) | 142(94.7%) | | | -------- | ---------- |
| Address | Urban | 46(30.67%) | 76(50.7%) | 12.68 | <0.001 | 0.425* | 0.265-0.684 |
| | Rural | 104(69.33%) | 74(49.3%) | | | -------- | ---------- |
| Consanguinity | Present | 111(74.0%) | 41(27.3%) | 65.81 | <0.001 | 7.696* | 4.59-12.87 |
| | Absent | 39(26.0%) | 109(72.7%) | | | -------- | ---------- |

*Significant at P-value < 0.05

A significant positive relationship was observed between the age group of (36-40) and multiparous pregnant women who just lost or may lose their fetuses prior to or at 20 weeks gestation with an odd ratio of (1.275) and 95% confidence interval of (0.76-4.57) (P<0.001). Again significant positive relationship was also seen between the age group of (>40) and multiparous pregnant women who just lost or may lose their fetuses prior to or at 20 weeks gestation with an odd ratio (5.526) and 95% CI of (1.16-26.22) (P<0.001).

**Gravidity data distribution among the studied groups:**

| Gravidity | Cases(No.150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| 2 | 1(0.67%) | 22(14.7%) | 92.60 | <0.001 | 0.047 | 0.006-0.362 |
| 3 | 7(4.67%) | 54(36.0%) | | | 0.114 | 0.044-0.293 |
| 4 | 42(28.0%) | 42(28.0%) | | | 0.948 | 0.41-1.984 |
| 5 or more | 100(66.67%) | 32(21.3%) | | | 3.201 | 1.781-5.753 |

Parity data distribution among the studied groups:

| Parity | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| 1 | 1(0.67%) | 0(0.0%) | 15.001 | 0.005 | --------- | --------- |
| 2 | 42(28%) | 25(16.7%) | | | 4.032* | 1.849-8.793 |
| 3 | 54(36%) | 59(39.3%) | | | 2.156* | 1.063-4.374 |
| 4 | 15(10%) | 36(24%) | | | 0.087* | 0.0017-3.577 |
| 5 or more | 38(25.33%) | 30(20) | | | 2.960* | 1.369-6.400 |

* Significant at P-value < 0.05

**Previous abortion data distribution among the studied groups:**

| Previous abortions | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Zero | 0(0.0%) | 131(87.3) | 23.45 | <0.001 | -------- | -------- |
| 1 | 52(34.67%) | 12(8%) | | | 4.597* | 1.278-10.396 |
| 2 or more | 98(65.33%) | 7(4.7%) | | | 3.261* | 1.209-8.791 |

*Significant at P-value < 0.05

**Inter-pregnancy interval data distribution among the studied groups:**

| Interval | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| 1 year or more | 36(24%) | 125(83.3%) | 109.18 | <0.001 | 16.765 | 9.430-29.805 |
| Less than 1 Year | 114(76%) | 25(16.7%) | | | --------- | --------- |

**Congenital anomalies data distribution among the studied groups:**

| Congenital anomalies | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Present | 67(44.67%) | 10(6.7%) | 56.40 | <0.001 | 11.268* | 5.492-23.122 |
| Absent | 83(55.33%) | 140(93.3%) | | | -------- | ------- |

*Significant at P-value < 0.05

**Outcomes data distribution among the studied groups:**

| Outcomes | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Success | 74(49.33%) | 145(96.7%) | 85.02 | <0.001 | 0.034* | 0.013-0.087 |
| Loss | 76(50.67%) | 5(3.3%) | | | ------- | ------- |

*Significant at P-value < 0.05

**Uterine anomalies data distribution among the studied groups:**

| Uterine anomalies | Cases(150) | Controls(150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Present | 32(21.33%) | 2(1.3%) | 29.1 | <0.001 | 19.607* | 4.598-83-613 |
| Absent | 118(78.67%) | 148(98.7%) | | | --------- | -------- |

*Significant at P-value < 0.05

**Antenatal care data distribution among the studied groups:**

| Antenatal care | Cases (150) | Controls (150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Zero | 41(27.33%) | 5(3.3%) | 72.877 | <0.001 | 41.067* | 13.921-121.147 |
| 1-4 | 94(62.67%) | 68(45.3%) | | | 7.021* | 3.719-13.254 |
| 4 or more | 15(10%) | 77(51.4%) | | | 0.029* | 0.017-0.843 |

*Significant at P-value < 0.05

**History of bleeding data distribution among the studied groups:**

| History of bleeding | Cases (150) | Controls (150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Present | 136(90.67%) | 6(4%) | 227.32 | <0.001 | 249.23* | 92.107-674.387 |
| Absent | 14(9.33%) | 144(96%) | | | -------- | -------- |

*Significant at P-value < 0.05

**Gestational age data distribution among the studied groups:**

| Gestational age | Cases (150) | Controls (150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| <13 weeks | 48(32%) | 0(0.0%) | 56.55 | <0.001 | -------- * | - ------- * |
| 13 weeks or more | 102(68%) | 150(100%) | | | -------- * | - ------- * |

*Too high to be calculated

**Trauma and medical history data distribution among the studied groups:**

| Medical history | Cases (150) | Controls (150) | $X^2$ | P-value | Odd ratio | 95% CI |
|---|---|---|---|---|---|---|
| Hypertension | 32(22.3%) | 16(10.7%) | 5.234 | 0.026 | 2.18 | 1.11-4.14 |
| Diabetes | 14(9.5%) | 3(2%) | 3.84 | 0.052 | 3.87 | 0.99-15.16 |
| Antiphospholipid Syndrome | 6(4%) | 2(1.3%) | 2.11 | 0.146 | 3.127 | 0.621-15.749 |
| Drugs | 19(12.67%) | 7(4.7%) | 6.246 | 0.012 | 3.009* | 1.225-7.391 |
| Trauma | 74(49.33%) | 1(0.7%) | 94.49 | <0.001 | 145.027* | 19.77-163.87 |
| TORCH | 30(20%) | 0(0.0%) | 33.81 | <0.001 | ----------$^+$ | ----------$^+$ |
| Fever | 68(45.33%) | 10(6.7%) | 57.93 | <0.001 | 11.580* | 5.645-23.757 |

*Significant at P-value < 0.05

$^+$Too high to be calculated

## DISCUSSION

Several factors that may contribute to miscarriage rates were identified, both in their raw and modified forms by this study. The present study found that there is a significant decrease in the risk of miscarriage associated with an increase in the maternal educational level. Surprisingly, our result is opposite to the result of Roqia in Mosul city 2016, which found that there is no significant association between mother's educational level and the risk of miscarriage.

The occupational risk of miscarriage is usually associated with exposure to heavy metals, organochlorine and mine workers.[13] However, in Iraq, women are usually not involved in such occupations. This study found that there is no significant association between the risk of abortion and whether the mother is employed or not.

We found that females living in rural areas are at the greatest risk of having a miscarriage in comparison to those living in urban areas. These educational campaigns

may be deficient in our locality. Women who live in rural areas usually have poor antenatal care and suffer from more medical conditions that may precipitate a miscarriage like anemia, toxoplasmosis and malnutrition.[14]

Regarding maternal age, in the present study, advanced maternal age is significantly associated with an increase in the risk of abortion. Similar to our findings, a study done in Norway on 583 mothers with a history of miscarriage found that advanced maternal age was a strong predictor of miscarriage.[15] Furthermore, pregnancy loss due to chromosomal abnormality is mostly associated with advanced maternal age.[16]

History of previous miscarriage is strongly associated with recent one according to this study, 65% of cases had history of miscarriage. In agreement with our findings, Maconochie et al, in their case-control study on 616 women regarding the analysis of the risk factors for 1st trimester miscarriage in the United Kingdom; found that there is a significant association between previous miscarriage and subsequent pregnancy loss.[17] Recurrent miscarriages have different etiologies ranging from infection, chromosomal abnormalities, uterine abnormalities and chronic medical illnesses.[18]

Most of the miscarriage cases in the present study (76%) occurred in women who had inter- pregnancy intervals of less than one year. However, according to a study done on Egyptian women whose 1st pregnancy ended in miscarriage, those who had an interval among pregnancies greater than 12 months were twice as likely to experience a miscarriage as those who had one less than 6 months apart.[19]

Half of the cases in the present study had a history of previous pregnancy loss while 55% of them had a family history of delivering a baby with congenital malformations. Miscarriage has been linked to more than 50 maternal genetic different variants.[20] Woolner and her colleagues in their systematic review in 2020 found that there may be a genetic component to the increased risk of miscarriage in women with positive family history.[21]

Almost 21% of the studied women who had a history of miscarriage were diagnosed with uterine structural abnormality in comparison to cases from the control group. Depending on the findings of Clifford et al study, significant uterine abnormalities were present in 9 out of 500 women (1.8%).[22]

It is well known that chronic medical diseases like diabetes mellitus, hypertension, thyroid diseases as well as obesity increase the risk of miscarriage among pregnant women.[23] In the present study, 28% of the pregnant women with a history of miscarriage have another associated medical illness in comparison to 5% of the controls who had another medical condition associated with miscarriage. Archana Pate and his colleagues studied the medical health of (72750) pregnant women in India over seven years, they found that the presence of anemia and malnutrition are major risk factors for prenatal complications like miscarriage, stillbirth and low birth weight.[24]

## CONCLUSIONS

This study showed that increased gravidity and parity, short inter-pregnancy interval, bad previous obstetrical history in form of antepartum hemorrhage or previous fetal congenital malformations are all linked to increased risk of miscarriage among multiparous women. As with any other medical illness, advanced age had a special significant association with the risk of miscarriage. Chronic medical illnesses had a different effect on the miscarriage risk, this heterogeneity may be related to the number cases with that specific illness.

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