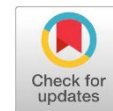


Research Article

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Identifying Risk Factors and the Proportion of Miscarriage Among Women Attending Medical Centers in Almarj City During the Period from May to December 2024

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Abstract

This study investigated the prevalence and risk factors associated with miscarriage among pregnant women in Almarj City in Libya, between May and December 2024. Data were collected via a structured questionnaire from 200 participants aged 20-49 years who had experienced miscarriages and attended three healthcare facilities: Qesor Alshefa, Al-Marj Teaching Hospital, and Alnazah Medical Center. Results revealed that the highest prevalence of miscarriage (42.5%) occurred among women aged 20–29 years. Blood type A+ was the most common (40%) among the participants. Housewives constituted the majority of cases (60%), suggesting a potential association between physical strain and miscarriage risk. The majority of miscarriages (67.5%) occurred during the first trimester, which is consistent with global epidemiological trends. Significant risk factors identified included underlying health conditions (47.5%) of participants had hypertension or diabetes mellitus, exposure to passive smoking (47.5%), and thyroid disorders (27.5%). Notably, no participants reported alcohol consumption, reflecting prevailing socio-cultural norms. The study underscores the multifactorial etiology of miscarriage, highlighting the significant roles of maternal age, health status, and environmental exposures.

Keywords: Miscarriage, Maternal Health, Passive Smoking, Thyroid Disorders, Diabetes Mellitus, Hypertension.

INTRODUCTION

Miscarriage is a significant health issue affecting approximately 10% of women, with incidence rates increasing notably among women over the age of 35. The rate of miscarriage during the first trimester of pregnancy ranges between 15% and 20%. While the exact causes are not always clear, several factors are believed to contribute, including genetic abnormalities, congenital uterine anomalies, cervical insufficiency, intrauterine adhesions, hormonal imbalances, and immune-related issues. In many cases, the cause remains unidentified (Dugas & Slane, 2023; Larsen et al., 2013). Recurrent miscarriage, in particular, can be attributed to a variety of factors, including genetic predisposition, maternal health conditions, and lifestyle choices. It is estimated that only 30% of miscarriage cases have identifiable causes, while the remaining 70% remain unexplained and cannot be diagnosed through standard laboratory tests (ESHRE, 2018; Practice Committee of the American Society for Reproductive Medicine, 2023).

Despite this global understanding, miscarriage remains a common and rapidly growing health



problem among women in Libya. There is a critical lack of local studies investigating the specific causes and patterns within the unique Libyan context. This study, therefore, aims to address this gap by focusing on the primary causes of miscarriage among Libyan women. By examining a specific segment of the population, this research seeks to provide clearer insight into the key factors contributing to its occurrence. The importance of this investigation lies in the severe health risks miscarriage poses, particularly to pregnant women and fetal health in Libya. Early intervention and appropriate treatment during pregnancy are crucial for preventing harm to both mother and fetus. Consequently, this research will provide valuable insights that can inform and guide local healthcare practices, policies, and the development of more effective preventive and therapeutic strategies for maternal and child health.

Objectives of the Study:

This research aims to:

1. Estimate the proportion and distribution of miscarriage cases among women seeking care in selected healthcare facilities in Almarj City and describe their demographic and clinical characteristics.
2. Identifying the major factors that lead to miscarriage in women and early treatment to avoid complications resulting from it, whether on the mother or the fetus.
3. The research may help in developing effective programs to decrease the risk factors that lead to miscarriage in women.

MATERIALS AND METHODS

Study Design

The study was conducted in the gynecologic and obstetric care units in Almarj City. Data was collected through standardized questionnaires administered during direct interviews with patients who had experienced miscarriage. The instruments were designed to obtain comprehensive data on the participants' health status, medical history, and lifestyle factors (Appendix 1).

Sampling Method

This study employed a cross-sectional design. A convenience sample of 200 women, aged between 20 and 49 years, who had experienced a miscarriage and sought care at the gynecologic and obstetric units of three selected clinics in Almarj City between May and December 2024, was recruited. Participants were enrolled from the following facilities: Qesor Alshefa (n = 70), Al-Marj Teaching Hospital (n = 55), and Alnazah Medical Center (n = 75). It is crucial to emphasize that this sample comprises women who presented for care following a miscarriage and does not represent the total population of pregnant women in Almarj City. Consequently, the results describe the characteristics and associated factors among identified miscarriage cases within these healthcare settings. They provide an estimate of the distribution of cases but do not calculate the overall population prevalence rate of miscarriage, which would necessitate a different, population-based sampling methodology.

Table (1). Distribution of miscarriage cases by clinics.

Clinic Name	Number of Women
Qesor Alshefa	70
Al-Marj Teaching Hospital	55
Alnazah Medical Center	75
Total	200

Data Collection Mechanism

Ethical approval for the study was obtained from the relevant authorities to conduct the study in the selected clinics. Written informed consent was secured from all participants following a comprehensive explanation of the study's purpose, procedures, and potential benefits. Specially designed instruments were used to collect exhaustive information on participants' health status, medical history, lifestyle variables, and obstetric histories.

Statistical Analysis

Data from the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS) software program. Frequencies and percentages were calculated.

RESULTS

This study included 200 women who experienced miscarriage and sought care at the participating clinics between May and December 2024 in Almarj City. The following tables and figures describe the distribution of these cases according to various sociodemographic and clinical factors.

Data in Table 2 and Figure 1 showed that the highest percentage of miscarriages (42.5%) occurred among women aged 20–29 years, while those aged 30–39 years accounted for 35%. The lowest percentage of miscarriages (22.5%) was recorded among women aged 40–49 years.

Table (2). Distribution of miscarriage cases by age.

Age (year)	Frequency	Percentage
20-29	85	42.5%
30-39	70	35%
40-49	45	22.5%
Total	200	100%

Data in Table 3 and Figure 2 represent differences in the rate of women who experienced miscarriages based on blood types (A+, B+, O+, AB+, B-, and O-), with percentages of 40%, 27.5%, 17.5%, 10%, 2.5%, and 2.5%, respectively.

Table (3). Distribution of miscarriage cases by blood group.

Blood Group	Frequency	Percentage
A+	80	40%
B+	55	27.5%
O+	35	17.5%
AB+	20	10%
B-	5	2.5%
O-	5	2.5%
Total	200	100%

Data presented in Table 4 and Figure 3 showed that the highest percentage of miscarriage cases occurred among housewives (60%). Conversely, employed women exhibited a lower incidence of miscarriage (40%).

Table (4). Distribution of miscarriage cases by lifestyle.

Variable	Frequency	Percentage
Housewife	120	60%
employed women	80	40%
Total	200	100%

Data presented in Table 5 and Figure 4 showed that the majority of miscarriages (67.5%) occurred during the first trimester, while 37.5% occurred during the second trimester.

Table (5). Distribution of miscarriage cases by gestational age.

Gestational Age	Frequency	Percentage
The first trimester	135	67.5%
The second trimester	75	37.5%
Total	200	100%

Data presented in Table 6 show that 100% of the pregnant women in the study reported no alcohol consumption during pregnancy. Statistical significance tests (such as Chi-square) could not be performed for this variable because it is a constant with zero variance (100% of the participants reported no alcohol consumption).

Table (6). Distribution of miscarriage cases by alcohol consumption during pregnancy.

Alcohol consumption	Frequency	Percentage
Yes	0	0%
No	200	100%
Total	200	100%

Data presented in Table 7 and Figure 5 indicated that among pregnant women who experienced miscarriages, 57.5% had no prior surgical history, while 42.5% reported a history of surgical procedures.

Table (7). Distribution of miscarriage cases by surgical history.

Variable	Frequency	Percentage
No surgical history	115	57.5%
Surgical history	85	42.5%
Total	200	100%

Data presented in Table 8 and Figure 6 showed that 70% of women who experienced miscarriages had no uterine or cervical issues, while 30% had uterine or cervical issues.

Table (8). Distribution of miscarriage cases by uterine and cervical health status.

Variable	Frequency	Percentage
No uterine or cervical issues	140	70%
Uterine or cervical issues	60	30%
Total	200	100%

Data presented in Table 9 and Figure 7 indicated that 47.5% of women who experienced miscarriages had either hypertension or diabetes.

Table (9). Distribution of miscarriage cases by prevalence of diabetes and hypertension.

Variable	Frequency	Percentage
Diabetes and hypertension		
Yes	95	47.5%
No	105	52.5%
Total	200	100%

Data presented in Table 10 and Figure 8 showed that 45% of women who experienced miscarriages reported taking herbs during pregnancy.

Table 10: Distribution of miscarriage cases by herbal consumption during pregnancy.

Herbal consumption	Frequency	Percentage
Yes	90	45%
No	110	55%
Total	200	100%

The data presented in Table 11 and Figure 9 showed that 62.5% of women who miscarried did not take antibiotics during the early weeks of pregnancy, while 37.5% reported taking antibiotics during this period.

Table (11). Distribution of miscarriage cases by antibiotic use during pregnancy.

Use antibiotic drugs	Frequency	Percentage
No	125	62.5%
Yes	75	37.5%
Total	200	100%

The data presented in Table 12 and Figure 10 indicated that 72.5% of women who miscarried did not have thyroid disease, while 27.5% had thyroid disease.

Table (12). Distribution of miscarriage cases by thyroid disease during pregnancy.

Thyroid disease	Frequency	Percentage
No	145	72.5%
Yes	55	27.5%
Total	200	100%

The data in Table 13 and Figure 11 indicate that 52.5% of women who miscarried were not exposed to passive smoking, while 47.5% were exposed to passive smoking .A Chi-square goodness of fit test was performed to determine whether the distribution of passive smoking exposure differed significantly .The analysis revealed no statistically significant difference between two groups ($X^2=0.50, df=1, P=0.479$), indicating that exposure to passive smoking was evenly distribution among the miscarried cases.

Table (13). Distribution of miscarriage cases by exposure to passive smoking during pregnancy.

Exposure to passive smoking	Frequency	Percentage	Chi-square	P-value
No	105	52.5%	0.50	0.479
Yes	95	47.5%		
Total	200	100%		

DISCUSSION

The present study described the results of estimating the prevalence and identifying risk factors that contribute to miscarriage among women. In this study, the highest percentage of miscarriages occurred among women aged 20–29 years. This result is consistent with the fact that women in their twenties are typically at the peak of fertility, leading to a higher number of pregnancies and consequently a higher likelihood of miscarriage. Additionally, the risk of miscarriage increases with age due to declining egg quality and a higher incidence of chromosomal abnormalities (Magnus et al., 2019).

The current study found that the highest rate of miscarriage among women with different blood types (A+, B+, O+, AB+, B-, and O-) recorded percentages of (40%, 27.5%, 17.5%, 10%, 2.5%, and 2.5%), respectively, based on the data in Table 3 and Figure 2. These results suggest that blood type may play a role in pregnancy outcomes, potentially due to immunological or genetic factors. However, the relationship between blood type and miscarriage risk is complex and likely influenced by multiple variables, including Rh status and environmental factors. Our data are consistent with reports indicating that women with blood type A+ were more likely to miscarry (Goel et al., 2015; Egerup et al., 2016).

The overall high prevalence of miscarriage cases occurred among housewives (60%). This may be attributed to the physically demanding nature of domestic responsibilities, which can include heavy lifting and prolonged physical exertion, as well as potentially limited access to healthcare resources. Conversely, employed women exhibited a lower incidence of miscarriage (40%), which could be associated with increased health awareness, better health literacy, and more frequent access to prenatal medical supervision. Our data are consistent with reports that indicated the importance of lifestyle and occupational factors in determining miscarriage risk (Dugas & Slane, 2023).

In the current study, the most common stage for miscarriages was the first trimester. This result is consistent with previous studies indicating that early miscarriages are often linked to genetic or developmental issues, while later miscarriages are more likely due to maternal health or placental problems (ACOG, 2018; Magnus et al., 2019).

The present study also shows that alcohol consumption is not acceptable for females in Libyan society, especially during pregnancy. Our data are consistent with previous research conducted in cultures that have demonstrated that cultural and religious norms significantly reduce alcohol consumption among pregnant women (Al-Obaidi et al., 2020; Muggli, E., O'Leary, C., Forster, D., et al., 2023).

In the current study, among pregnant women who experienced miscarriages, 75.5% had no prior surgical history. Conversely, 42.5% of the women who experienced miscarriages reported a history of surgical procedures. This result indicated that prior surgical history may not be a significant factor for miscarriage in this population. Our data are consistent with previous studies conducted in various countries, which indicate that a surgical history in women, particularly procedures involving the uterus, may increase the risk of miscarriage due to potential damage to the uterine lining or structural abnormalities (Bhattacharya et al., 2016; Saraswat et al., 2017).

The current study found that 40% of women who experienced miscarriages had uterine or cervical issues. This result is consistent with several reports that indicate that uterine anomalies or cervical incompetence are associated with an increased risk of miscarriage (Sugiura-Ogasawara et al., 2013).

The findings indicate that 47.5% of women who experienced miscarriages had either hypertension or diabetes. Both conditions are known to adversely influence pregnancy outcomes through mechanisms such as impaired placental perfusion and an increased risk of fetal abnormalities. These data are consistent with other reports, which indicate that miscarriage may be associated with hypertension and diabetes mellitus (Ananth et al., 2007; Kitzmiller et al., 2008).

The presenting study shows that there is (45%) of women who experienced miscarriage recurrence had taken herbs during pregnancy. These results illustrate the effect of consuming herbs during pregnancy, which can often lead to miscarriage. These data are consistent with previous research, which indicates that certain herbs may stimulate uterine contractions (Li et al., 2016; Dugoua et al., 2006). The current study indicates that women who consume antibiotics during the early weeks of pregnancy are at risk of miscarriage. Our data are consistent with studies that have highlighted the impact of antibiotics on maternal and fetal health (Muanda et al., 2017).

The present study also shows that 27.5% of women who miscarried had thyroid disease. These data are consistent with several reports from various countries, which indicate that miscarriage is associated with thyroid issues in pregnant women (Korevaar et al., 2019).

In this study, the results indicated that 47.5% of women who miscarried were exposed to passive smoking. These results indicate that exposure to passive smoking may play a role in increasing the risk of miscarriage among women. These data are consistent with strong international evidence, including studies from the United States (Pineles et al., 2014), Japan (Miura et al., 2021), and China (Zhang et al., 2019). This association continues to be reinforced by recent, high-quality research. A 2023 systematic review and meta-analysis published in *BMC Pregnancy and Childbirth* confirmed that exposure to secondhand smoke significantly increases the risk of miscarriage (Zhao et al., 2023).

CONCLUSION

The results indicated that the primary risk factors associated with miscarriage among pregnant women in this study included age, blood type, early gestational age, lifestyle, uterine abnormalities, using medications without a doctor's prescription, chronic diseases such as hypertension and diabetes mellitus, consumption of herbs, thyroid gland disorders, and exposure to passive smoking. This study provides a detailed profile of miscarriage cases presenting to major healthcare facilities in Almarj City. While it does not calculate a city-wide prevalence rate, it reveals that among the identified cases, the highest proportion was observed in women aged 20–29 years (42.5%), and it identifies several associated risk factors.

Recommendations

1. Avoid exposure to passive smoking to reduce the risk of miscarriage.
2. It is necessary to follow a healthy diet.
3. Do not take caffeine, nicotine, or alcohol during pregnancy.
4. Maintain a healthy weight to support a better pregnancy.
5. Do not take medicine without consulting a doctor.
6. Raise awareness among mothers about the importance of prenatal medical follow-ups for early detection of infections that may affect fetal health.
7. Study the effects of preventive treatments, such as maternal nutritional supplements during pregnancy.

8. Disseminate information on the relationship between maternal and fetal blood types and their impact on pregnancy.
9. Provide regular check-ups for pregnant women.
10. Expand the study scope to include a larger sample of pregnant women for more comprehensive and accurate results.
11. Manage chronic health conditions, such as high blood pressure and diabetes.
12. Conduct comprehensive medical tests, such as blood clotting tests and thyroid function tests, to identify potential risk factors.

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ETHICS

Ethical Approval: This study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Verbally informed consent was obtained from all individual participants included in the study after explaining the purpose of the research and ensuring the confidentiality of their data.

Duality of interest: The authors declare that they have no duality of interest associated with this manuscript.

Author contributions: Contribution is equal between authors.

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Appendix1
[Questionnaire]
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[Questionnaire on the Prevalence of Miscarriage in the Al-Marj Region from May 2024 to December 2024]

This research is designed to identify the prevalence of miscarriage and the risk factors that lead to it. It is understood that all information will be used for scientific research purposes and will be treated with strict confidentiality. Therefore, your cooperation in completing this questionnaire will be greatly appreciated.

Please mark (✓) inside the box that applies to your situation:

[Personal Information]:

Age :

.....years

Blood Type:

Has the woman ever experienced a miscarriage?

☐ Yes ☐ No

At what week did the miscarriage occur?

.....

Does the pregnant woman consume alcoholic beverages?

☐ Yes ☐ No

Has the woman ever undergone surgery?

☐ Yes ☐ No

Does the pregnant woman suffer from uterine problems?

☐ Yes ☐ No

Is the pregnant woman diabetic?

☐ Yes ☐ No

Does the pregnant woman have high blood pressure?

☐ Yes ☐ No

Does the pregnant woman consume herbs during pregnancy?

☐ Yes ☐ No

Does the pregnant woman have thyroid problems?

☐ Yes ☐ No

Are you taking antibiotics during pregnancy, excluding the usual medications taken by pregnant women?

☐ Yes ☐ No

Have you been exposed to passive smoking?

☐ Yes ☐ No

Is the pregnant woman a housewife?

☐ Yes ☐ No

If the answer is no, please specify the occupation