CLINICAL PREDICTORS OF MISCARRIAGE AMONG WOMEN: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Around 5% of pregnancies result in spontaneous pregnancy loss, which is a very typical occurrence worldwide. Since miscarriages are usually irreparable and can have a severe psychological impact on women and their families, as well as potentially cause delays in obtaining successful pregnancies, prevention is the only effective option. Using a sample of 1,196 pregnant women, prior research has examined a number of miscarriage risk variables, including age, smoking, body mass index (BMI), PCOS, and infertility.

Objective: To determine clinical predictors of miscarriage among women.

Study design: a retrospective study

Place: Memon Medical Institute Hospital, Safoorah Karachi

Duration: Jan 2020 – Dec 2021

Methodology: This study included all the women who had live births and miscarriages. History of cesarean delivery, the age of the women at the time of pregnancy, BMI, gestational diabetes mellitus (GDM), parity, history of miscarriage, diabetes mellitus (DM), hypertension, and history of premature delivery were among the variables taken from HMIS. Women who had stillbirths or had chromosomal or genetic problems were not included in the study.

Results: There were a total of 500 women who were a part of this research out of which 87.6% (n=438) had a live birth while 12.4% (n=62) had miscarriages. The mean age was 31.1 years. Majority of the women had normal body mass index while the rest of them were obese or overweight.

Conclusion: There is a considerable increase in the chance of miscarriages due to advanced maternal age, greater BMI, and a history of previous losses.

Keywords: miscarriages, advanced maternal age, BMI, abortion.

INTRODUCTION

Around 5% of pregnancies result in spontaneous pregnancy loss, which is a common occurrence worldwide [1]. Since miscarriages are usually irreparable and can have a severe psychological impact on women and their families, as well as potentially cause delays in obtaining successful pregnancies, prevention is the only effective option [2, 3]. Numerous variables, both genetic and non-genetic, can contribute to spontaneous abortion [4]. Polymorphisms and chromosomal abnormalities are among the genetic causes; non-genetic causes include infections, thrombophilic disorders, personal medical

history, endocrine problems, occupational dangers, and socioeconomic status [5]. Reducing risk factors is thought to be able to stop up to 25% of spontaneous abortions [6].

Using a sample of 1,196 pregnant women, prior research has examined a number of miscarriage risk variables, including age, smoking, body mass index (BMI), polycystic ovary syndrome (PCOS), and infertility [7]. According to the study, 16% of pregnancies end before the sixth or seventh week of gestation [8]. Furthermore, there is a larger chance of early pregnancy loss associated with smoking [9]. Age and obesity, on the other hand, did not significantly correlate with an increased chance of losing a pregnancy early. One factor that increases the likelihood of more miscarriages is a previous history of miscarriages. The practice of women delaying parenthood till later in life exacerbates this clinical problem. Consequently, a couple's ability to conceive in the future may be hampered by even one loss.

While the specific risk factors for miscarriage have been well investigated, the prevention of miscarriage is still largely unexplored [10]. Particularly for women who are not at high risk of miscarriage, doctors frequently lack a verified list of risk factors. Furthermore, more research is necessary to determine the clinical variables that contribute to early pregnancy in developing nations [11]. Effective counseling and prenatal care can be supported by knowing the importance of certain factors in spontaneous pregnancy loss and identifying women who are at risk, even when some aspects are beyond one's control. By alerting patients of their risks and predicting the possibility of miscarriage based on specific criteria and lab tests, miscarriage risk can be reduced and fear and mistrust can be mitigated. The purpose of this study is to determine clinical predictors of miscarriage among women.

METHODOLOGY
This study included all the women who had live births and miscarriages. The co-investigator received the data for this study from the Hospital Management Information System (HMIS). After being copied to a Microsoft Excel file, every piece of data was examined for any missing values. Patients whose data were not complete were not included in the final analysis.

Exclusion criteria: Women who had stillbirths or had chromosomal or genetic problems were not included in the study.

History of cesarean delivery, the age of the women at the time of pregnancy, BMI, gestational diabetes mellitus (GDM), parity, history of miscarriage, diabetes mellitus (DM), hypertension, and history of premature delivery were among the variables taken from HMIS. The main outcome variable was the pregnancy result, which was divided into "live birth" and "miscarriage" categories.

Statistical Analysis: STATA Version 16.0 was used to analyze the data. For continuous data, means and standard deviations were provided; for categorical variables, percentages. T-tests and Chi-square tests with a significance level of $p < 0.25$ were employed in univariate analysis. A multivariable logistic regression model with a final significance cut-off of $p < 0.05$ includes significant variables.

RESULTS
There were a total of 500 women who were a part of this research out of which 87.6% (n=438) had a live birth while 12.4% (n=62) had miscarriages. The mean age was 31.1 years. The majority of the women had normal body mass index, while the rest of them were obese or overweight.

Table number 1 shows the characteristics of the women involved in this research.

Table No. 1: the characteristics of the women (n=500)

Variables	n	%
Parity		
● **0**	150	30

● **1**	160	32
● **2 or more**	190	38
BMI		
● **Normal**	260	52
● **Underweight**	20	4
● **Obese**	220	44
History of miscarriage		
● **Yes**	435	87
● **No**	65	13
Diabetes		
● **Yes**	40	8
● **No**	460	92
Hypertension		
● **Yes**	95	19
● **No**	405	81
History of C-section		
● **Yes**	160	32
● **No**	340	68
Hypothyroidism		
● **Yes**	50	10
● **No**	450	90

Table number 2 shows the comparison of the characteristics of the participants with pregnancy outcomes.

Table 2: comparison of the characteristics of the participants with pregnancy outcomes (n=500)

Variables	**Live Birth (n=438)**		**Miscarriages (n=62)**	
	n	**%**	**n**	**%**
Parity				
● **0**	131	29.9	15	24.2

● **1**	140	31.9	18	29.1
● **2 or more**	167	38.2	29	46.7
Age (years)				
● **<30**	184	42.1	17	27.4
● **30-35**	153	34.9	25	40.3
● **36-40**	88	20.1	9	14.5
● **>40**	13	2.9	11	17.8
BMI				
● **Normal**	241	55.1	18	29.1
● **Underweight**	17	3.8	2	3.2
● **Obese**	180	41.1	42	67.7
History of miscarriage				
● **Yes**	390	89.1	47	75.8
● **No**	48	10.9	15	24.2
Diabetes				
● **Yes**	35	8	5	8.1
● **No**	403	92	57	91.9
Hypertension				
● **Yes**	79	18.1	17	27.5
● **No**	359	81.9	45	72.5
History of C-section				
● **Yes**	145	33.2	15	24.2
● **No**	293	66.8	47	75.8
Hypothyroidism				
● **Yes**	44	10.1	6	9.7
● **No**	394	89.9	56	90.3

Table number 3 shows multivariable logistic regression of factors associated with miscarriages.

Table No. 3: multivariable logistic regression of factors associated with miscarriages

Variables	AOR (95% Cl)	p-value
Age (years)		
● **<30**		
● **30-35**	1.54	0.201
● **36-40**	1.94	0.851
● **>40**	10.28	0.001
BMI		
● **Normal**		
● **Underweight**	1.25	0.833
● **Obese**	3.18	0.001
History of miscarriage		
● **Yes**	2.91	0.003
● **No**		

DISCUSSION

The natural demise of a fetus before it can survive on its own is called a miscarriage [12]. A history of miscarriages, drug addiction, obesity, smoking, diabetes, and advanced maternal age are among the factors that raise the chance of miscarriage. Roughly 45% of women over 40 years and 10% of women under 35 years of age experience pregnancy loss. According to a study by Hur et al., women using assisted reproductive technology (ART) who experience early pregnancy loss are considerably more likely to have a thin endometrium, high FSH levels, and higher basal estradiol [13]. The purpose of this study was to determine risk factors for miscarriages. Obesity, a history of prior losses, and maternal age above 40 years were found to be significant predictors.

Even if the effects of aging on women's reproductive potential are not fully known, they must be investigated in light of the global trend of delaying children. Women's fertility is known to decrease progressively after the age of 20 years, and to drastically diminish around the age of 35 years [14, 15]. The greater miscarriage rates in later reproductive years could be explained by decreased egg quality and a less receptive endometrium. As the corpus luteum and fertilized eggs produce insufficient progesterone to facilitate implantation during senescence, advanced maternal age is likewise associated with low progesterone levels.

According to our research, women who have higher body mass indices are more likely to have miscarriage, which is consistent with the findings of Arck et al [16]. The effects of being underweight and overweight on one's capacity to procreate have been thoroughly researched in recent years. Regardless of age, Arck et al. found that women with a BMI of less than 20 kg/m2 were more likely to miscarry, particularly in the first seven weeks of pregnancy. An important factor in this is the established correlation between blood leptin levels and BMI. Leptin, which is secreted by adipose tissue, controls food intake by establishing a feedback loop between the hypothalamic centers and

energy reserves, hence regulating body weight. Therefore, it is believed that leptin only allows energy-intensive processes, such as pregnancy, when there are sufficient electricity stores to support them. While our study did not find a connection between parity and miscarriages, prior research suggests that having numerous pregnancies increases the risk of miscarriages [17, 18]. We did not find that diabetes mellitus increased the chance of miscarriage, in contrast to Mills et al [19]. In line with Zargar et al.'s findings, we discovered that a history of miscarriages markedly increased the likelihood of another miscarriage in the future, underscoring the importance of appropriate screening [20]. Since none of the individuals smoked, we were unable to evaluate smoking; nonetheless, other research has connected smoking to an increased risk of miscarriage because tobacco smoke contains toxic substances.

There are few limitations to the study. First, significant characteristics like education and socioeconomic level were not included in the retrospective data collection. Secondly, the study only contained information from a single hospital. More thorough follow-up studies should be conducted in the future throughout the region to discover all possible miscarriage risk factors in women with the goal of creating efficient therapies. This study emphasizes that miscarriages are caused by a combination of psychological, physiological, historical, and demographic factors, highlighting miscarriage hazards that are often neglected in women who appear to be at low risk.

CONCLUSION
The study concludes that there is a considerable increase in the chance of miscarriages due to advanced maternal age, greater BMI, and a history of previous losses.

Funding source
This study was conducted without receiving financial support from any external source.

Conflict in the interest
The authors had no conflicts of interest related to the execution of this study.

Permission
Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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