SPONTANEOUS MISCARRIAGES AND ITS ASSOCIATION WITH RISK DETERMINANTS IN PREGNANT OBESE WOMEN VISITING KHYBER TEACHING HOSPITAL PESHAWAR

Kausar Rehman Shinwari[1], Heema[2], Bakhtawar Rehman[3], Sana Rehman Shinwari[4], Habiba Khalid[4], Fahmida Sattar[5]

Abstract

Objectives: This study aims to determine the frequency of spontaneous miscarriages among pregnant obese women as well as to find the possible association between increasing age, parity, gravidity and gestation period with spontaneous miscarriages.

Methods: This cross-sectional study includes 163 obese pregnant women. WHO sample size calculator was used to identify sample size. All the pregnant women fulfilling our inclusion criteria were included in the study. The demographic information was recorded in pre-designed proforma. Spontaneous miscarriage was considered positive if the patient has spontaneous loss of pregnancy prior to viability that is gestational age of 23 weeks and 6 days. It was diagnosed by history of vaginal bleeding (bleeding ≥ 300 ml) & abdominal pain (assessed as VAS scale, score greater than 3) & confirmed on ultrasound scan of pelvis (absence of fetal heart beat). Data was analyzed using SPSS version 22.0.

Results: The mean age was 31±8.18 years where 59 (36%) of the participants were in between 18-30 years while 104 (64%) patients were in the age range of 31-40 years. Similarly, 62 (38%) patients were primigravida, 65 (40%) women had Primipara and 67 (41%) patients had <12 weeks of gestation period. The frequencies of miscarriages were high in patients with increasing age, multi gravidity, multiparity and gestation period greater than 12 weeks. However, the results were not statistically significant.

Conclusion: The frequencies of spontaneous miscarriages were 14%. The rates of spontaneous miscarriages were higher in women with increasing age, multi-parity, multi-gravidity and higher gestation period.

Keywords: Spontaneous miscarriages, obesity, obese women, risk factors

Introduction

Spontaneous miscarriage is one of the important complications of pregnancy affecting approximately 30% of all pregnancies and 10 – 15% of all clinically recognized pregnancies in general population [1].

1. Women Medical Officer, DHQ teaching hospital, KDA Kohat.
2. Assistant Professor, Khyber Medical University, Institute of Medical Sciences, Kohat.
3. Department of Gynecology, Khyber Teaching Hospital Peshawar.
4. Department of Gynecology, Hayatabad Medical Complex Peshawar.
5. Assistant Professor, Shekh Zayed Bin Khalifa Hospital Quetta

Address for Correspondence:
Dr. Heema
Assistant Professor, Khyber Medical University, Institute of Medical Sciences, Kohat
heema123dr@gmail.com

The exact prevalence of spontaneous miscarriages is not known due to the fact that women are unknown of her pregnancy and miscarriages occur. Most of the miscarriages are sporadic and non-recurrent and are often due to chromosomal abnormalities. However, multiple studies reported different prevalence in the range of 10-20% [2]. Multiple factors have been found to link with miscarriages but the exact mechanism is yet to be identified. In about 50% only the underlying mechanism is identified. The known causes of miscarriages are increased maternal age, chromosomal & metabolic abnormalities, uterine anomalies, anti-phospholipid antibody syndrome, diabetes, thyroid disorders, drugs like methotrexate & epileptic drugs, infections like rubella, immunological factors, smoking, alcohol consumption, stress and obesity [3, 4]. Miscarriages impacts women future's reproductive health as well as miscarriages ends with depression, anxiety and post-traumatic stress. Furthermore, such women are more prone to have preterm delivery, low

birth weights, postpartum hemorrhage and perinatal death [5].

Obesity is determined by body mass index (BMI), where BMI above 30 is considered obese and according to the recent stats, around 1 billion people will be obese by 2030 [6]. Obesity is one of the important risk factors for miscarriages. According to a recent meta-analysis published on obesity and miscarriages concluded that obesity is one of the contributing factors in miscarriages [7].

The exact mechanism by which obesity increase the risk of miscarriage is unclear. However, obese women often have Polycystic ovaries or isolated insulin resistance which is associated with increased frequency of early pregnancy loss. Obesity is also considered as low grade inflammation thus it may interact with immune system and promote altered oocyte quality, altered endometrial receptivity & inflammatory reactions which are responsible for loss of pregnancy [8, 9].

Obesity is increasing problem of Pakistan which is related to poor outcome in pregnancy to both mother and child. Women are more obese then men in Pakistan and according to the published reports about 29.6% women are obese [10].

The present study aimed to determine the prevalence of spontaneous miscarriages in obese pregnant women as well as to find the possible association between different risk factors related to spontaneous miscarriages in obese pregnant women visiting Khyber Teaching Hospital Peshawar.

MATERIALS AND METHODS

Study design and setting

This cross-sectional study was carried out in the Gyne department, Khyber Teaching Hospital Peshawar after approval from the concerned department via letter no. 740/DME/KMC. Total 163 patients were enrolled in the study. The sample size was calculated using WHO sample size formula, where the prevalence of spontaneous miscarriages in obese women was taken as 12%, with 5^% margin of error and 95% confidence interval.

Inclusion exclusion criteria

All the pregnant patients with spontaneous unassisted conception and age between 18-45 years of any parity and obese as per WHO guidelines were included in the study. Pregnant patients with multiple pregnancies confirmed through ultrasound, recurrent miscarriages, medical disorders like diabetes, thyroid dysfunction or hypertensive patients were excluded from the study. Furthermore, patients not willing to participate in the study were also excluded from the study.

Data collection

After the approval and consent from the patients. Detailed history was taken from each patient who was in accordance with our inclusion criteria. All the demographics including gestation, weight, height, parity and gravida were recorded on pre-designed proforma. Period of gestation was calculated by dates. Per vaginal exanimation was done. Trans-vaginal scan or Pelvic ultrasound was done for confirmation of diagnosis. BMI was calculated for all the included patients. The frequency of spontaneous miscarriage was evaluated in obese women. Spontaneous miscarriage was considered positive if the patient has spontaneous loss of pregnancy prior to viability that is gestational age of 23 weeks and 6 days. It was diagnosed by history of vaginal bleeding (bleeding ≥ 300 ml) & abdominal pain (assessed as VAS scale, score greater than 3) & confirmed on ultrasound scan of pelvis (absence of fetal heart beat). All the observation was collected under the supervision of expert gynecologist.

Data analysis

All the data was entered in SPSS version 22.0. For numeric variable like age, period of gestation, height, weight, and BMI, means and standard deviation was calculated while categorical variable like parity, gravidity, spontaneous miscarriages were expressed in frequency and percentages. Spontaneous miscarriage was stratified among age, parity, gravidity, period of gestation to see effect modification. Chi-square test was applied to find any possible association between spontaneous miscarriages and increasing age, parity, gravidity and gestation period. P value ≤ 0.05 is considered as significant. Graphs were prepared using Microsoft Excel 2013.

RESULTS

Characteristics of study participants

This study includes total 163 obese pregnant women. The mean age of the study participants was 31±8.18 years. Age was categorized as 18-30 years and 31-40 years, where 59 (36%) of the participants were in between 18-30 years while 104 (64%) patients were in the age range of 31-40 years. Similarly, 62 (38%) patients were primigravida while 101 (62%) were multigravida. Primipara was found in 65 (40%) of the patients. Furthermore, 67 (41%) patients had <12 weeks of gestation period while 96 (59%) patients had >12 weeks of gestation. Spontaneous miscarriages was found in 23

(14%) of total patients. All the values are shown in table 1.

Table 1: Demographic data of participants (n=163)

Variables		Frequency	Percentages
Age	18-30 years	59	36
	31-40 years	104	64
Gravidity	Primigravid	62	38
	Multigravid	101	62
Parity	Primipara	65	40
	Multipara	98	60
Gestation period	<12 weeks	67	41
	>12 weeks	96	59
Spontaneous miscarriages	Yes	23	14
	No	140	86

The distribution of miscarriages among different study variables are shown in figure 1. The total number of miscarriages in age group between 18-30 years was 8, whereas these numbers were increased to 15 in age group 31-40years. Similarly, the number of spontaneous miscarriages in gravidity, parity and gestational period were same as shown in figure 1.

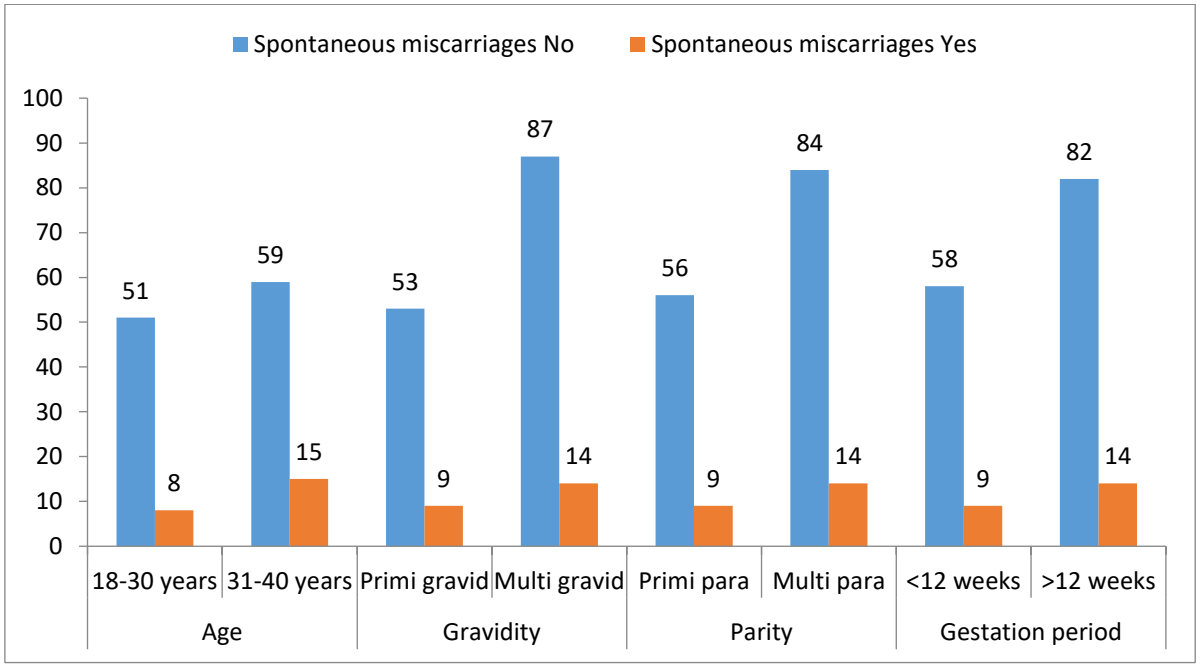

Figure 1: distribution of spontaneous miscarriages among different variables

Association of risk determinants with spontaneous miscarriages

To find the possible association between different variables of study population including age, gravidity, parity and gestation period with spontaneous miscarriages, chi-square test was applied. All the details are shown in table 2. There is no statistical association between spontaneous miscarriages and age, gravidity, parity and gestational period with p-values 0.87, 0.90, 0.93 and 0.83 respectively. However, the frequency of miscarriages were high in patients with increasing age, multi gravidity, multi-parity and gestation period greater than 12 weeks.

Table 2: Association of risk determinants with Spontaneous miscarriages

Risk determinants		Spontaneous miscarriages		p-value
		No	Yes	
Age (years)	18-30	51	8	0.87
	31-40	59	15	

Gravidity	Primi gravid	53	9	0.90
	Multi gravid	87	14	
Parity	Primipara	56	9	0.93
	Multipara	84	14	
Gestation period	<12 weeks	58	9	0.83
	>12 weeks	82	14	

Discussion

Despite major advances in the medical field, the underlying cause of loss of pregnancy is yet to be elaborated in more than 50% of women with recurrent miscarriages. According to a recent review article, obesity was found to be associated to loss of pregnancy [11]. The frequency of spontaneous miscarriages are more in obese rather than non-obese pregnant women [12]. Furthermore, the maternal obesity was associated with worst outcome to both mother and child as compared to individuals with normal BMI [13]. In our study, 14% of obese women were presented with spontaneous miscarriages. In consistent with our findings, a meta-analysis published by Cavalcante et al found similar findings [7]. A report published by Urooj et al in the same ethnicity reported 12% frequency of spontaneous miscarriages among pregnant obese women [14]. The exact mechanism is still under investigation however, obesity may result in pre-gestational and gestational diabetes that may leads to spontaneous abortion [15]. Furthermore, Altered oocyte quality, inflammatory reactions and altered endometrial receptivity are possible suggestive mechanisms [16]. Pearson et al, also found that obesity is associated with increase rate of miscarriages as compared to normal BMI women [17].

Increasing maternal age is one of the strongest risk factors for miscarriages. In our study, the prevalence of spontaneous miscarriages were high (24.5%) in patient with age group 31-40 years as compared with patients with age group 18-30 years though the association between increasing age and spontaneous miscarriages is not significant (p-value 0.87). Similar to our findings, a study from Nepal [5], a meta-analysis from Netherland [1] and a study from UK [18] also reported higher number of spontaneous miscarriages with increasing age.

Gravidity, parity and gestation period is not associated with spontaneous miscarriages in our study with p-values 0.90, 0.93 and 0.83 respectively, though the rates of spontaneous miscarriages were higher in women with multi-parity and multi-gravidity. Similar findings were also reported in the past where these factors have no role in spontaneous miscarriages [19]. However, the chances perinatal morbidity and adverse maternal outcome is more in primigravidas [20] and primiparity [21]. Similarly, multi-parity and multi-gravidity weaken the uterus and leads to spontaneous miscarriages as reported by Eldabae et al recently [22].

Conclusion

In this study, the frequency of spontaneous miscarriages in obese pregnant women was 14%. The rates of spontaneous miscarriages were higher in women with increasing age, multi-parity, multi-gravidity and higher gestation period. However, the results were statistically non-significant.

Author's contribution:

Kausar Rehman Shinwari and Bakhtawar Rehman were involved in data collection and writing of 1st draft. Sana Rehman Shinwari and Habiba Khalid were involved in finalizing the draft and proof reading. Fahmida Sattar has done the statistical analysis and proof reading. Heema conceptualize the project, finalize the final draft and proof reading. All the authors approved the final draft of the paper before submission

Conflict of interest: None

Funding: Nil

References:

1. Du Fossé NA, Van der Hoorn M-LP, van Lith JM, le Cessie S, Lashley EE. Advanced paternal age is associated with an increased risk of spontaneous miscarriage: a systematic review and meta-analysis. Human reproduction update. 2020;26(5):650-69.

2. Moradinazar M, Najafi F, Nazar ZM, Hamzeh B, Pasdar Y, Shakiba E. Lifetime prevalence of abortion and risk factors in women: evidence from a cohort study. Journal of pregnancy. 2020;2020.

3. Oliveira MTS, Oliveira CNT, Marques LM, Souza CL, Oliveira MV. Factors associated with spontaneous abortion: A systematic review. Revista Brasileira de Saúde Materno Infantil. 2020;20:361-72.

4. Quenby S, Gallos ID, Dhillon-Smith RK, Podesek M, Stephenson MD, Fisher J, et al. Miscarriage matters: the epidemiological, physical, psychological, and economic costs of early pregnancy loss. The Lancet. 2021;397(10285):1658-67.

5. Ghimire PR, Akombi-Inyang BJ, Tannous C, Agho KE. Association between obesity and miscarriage among women of reproductive age in Nepal. PLoS One. 2020;15(8):e0236435.

6. Lobstein T, Brinsden H, Neveux M. World obesity atlas 2022. 2022.

7. Cavalcante MB, Sarno M, Peixoto AB, Araujo Junior E, Barini R. Obesity and recurrent miscarriage: A systematic review and meta-analysis. Journal of Obstetrics and Gynaecology Research. 2019;45(1):30-8.

8. Gonçalves CCRA, Feitosa BM, Cavalcante BV, Lima ALGdSB, de Souza CM, Joventino LB, et al. Obesity and recurrent miscarriage: The interconnections between adipose tissue and the immune system. American Journal of Reproductive Immunology. 2023;90(3):e13757.

9. McLean S, Boots CE, editors. Obesity and Miscarriage. Seminars in reproductive medicine; 2023: Thieme Medical Publishers, Inc.

10. Bibi S, Khan TM, Zafar WM, Umer MJ, Iqbal UF, Maqsood MA, et al. Prevalence of obesity and impact of menopause on It among women of rural area of Punjab, Pakistan. European Journal of Medical and Health Sciences. 2021;3(1):108-11.

11. Malasevskaia I, Sultana S, Hassan A, Hafez AA, Onal F, Ilgun H, et al. A 21st century epidemy-obesity: and its impact on pregnancy loss. Cureus. 2021;13(1).

12. Qu P, Yan M, Wang D, Shi J. Association between pre-pregnancy body mass index and miscarriage in an assisted reproductive technology population: A 10-year cohort study. Frontiers in Endocrinology. 2021;12:646162.

13. Hanif S, Zubair M, Shabir N, Zia MS. A comparative study of maternal and fetal outcome in obese and non-obese pregnant women. Journal of The Society of Obstetricians and Gynaecologists of Pakistan. 2020;10(2):96-101.

14. UROOJ A, KHAN S, AWAN F. FREQUENCY OF SPONTANEOUS MISCARRIAGES IN OBESE AND NON-OBESE WOMEN. Biological and Clinical Sciences Research Journal. 2024;2024(1):670-.

15. Yong W, Wang J, Leng Y, Li L, Wang H. Role of obesity in female reproduction. International Journal of Medical Sciences. 2023;20(3):366.

16. Gonzalez MB, Robker RL, Rose RD. Obesity and oocyte quality: significant implications for ART and emerging mechanistic insights. Biology of reproduction. 2022;106(2):338-50.

17. Pearson AC, Mahmood TA. Obesity and recurrent miscarriage. Obesity and Gynecology: Elsevier; 2020. p. 91-6.

18. Frick AP. Advanced maternal age and adverse pregnancy outcomes. Best practice & research Clinical obstetrics & gynaecology. 2021;70:92-100.

19. Akther R. Outcome of grand multi-gravidity & multiparity A retrospective study. Journal of Dhaka Medical College. 2013;22(1).

20. Khalifa E, El-Sateh A, Zeeneldin M, Abdelghany AM, Hosni M, Abdallah A, et al. Effect of maternal BMI on labor outcomes in primigravida pregnant women. BMC Pregnancy and Childbirth. 2021;21:1-5.

21. Shechter-Maor G, Sadeh-Mestechkin D, Ganor Paz Y, Sukenik Halevy R, Markovitch O, Biron-Shental T. Does parity affect pregnancy outcomes in the elderly gravida? Archives of gynecology and obstetrics. 2020;301:85-91.

22. Eldabae EE, Taha N, Khalifa MA, Gamal A. Risk Factors Associated with Spontaneous Abortion at Woman's Health Hospital Assiut University. Assiut Scientific Nursing Journal. 2019;7(18):105-13.