Does increased Body Mass Index increase the risk of recurrent pregnancy loss?

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Abstract

Background: Obesity is a worldwide health problem. It is also associated with maternal and fetal outcome, such as sudden and unexplained intrauterine death, and diabetes, and polycystic ovary syndrome (PCOS). Little is known about the relation of obesity and recurrent pregnancy loss. This study aimed to assess the relation and impact of obesity on the risk of recurrent pregnancy loss.

Patient and methods: A cross sectional study was done in gynecology and obstetrics department in Azadi Teaching Hospital during 1st May 2019-1st August 2019. We randomly selected 402 patients of reproductive age. Data was obtained through standardized questionnaire including obstetrical , medical and surgical history information. BMI was divided according to the the WHO criteria: underweight <19, normal (19±24.9), over weight (25-29.9), and obese women (BMI >30).

Results: The prevalence of recurrent miscarriage was 24 (6%); those who had 1-2 miscarriages was 165 (41%). Recurrent miscarriage was significantly common among those aged ≥31 years 15 (9.9%), followed by 25-30 years 7(5.4%), and < 18 years 1 (3.4%). It was significantly common among obese 10 (12.7%), overweight 8 (4.5%) women, and underweight 1 (4.3). Recurrent pregnancy loss was not significantly more among those who had ≥5 children 2 (12.5%) than those had 0-1 children14 (6.1%). Risk to have 1-2 miscarriages was significantly 0.3 times among those aged <18 years than those aged 19-30 years, and those who had 2-4 children 1.6 times than those had 0-1 children . Recurrent miscarriage was significantly 3.6 times more among obese women as compared with normal weight women, and 3.2 times among those aged ≥31, as shown in Table 4.

Conclusion and recommendation: Obesity was significantly associated with increased risk of RPL. It is important to recommend females with recurrent pregnancy loss to decrease weight in order to get better results.

Key words: recurrent miscarriage, recurrent pregnancy loss, obesity, overweight, BMI

Introduction

The definition of recurrent miscarriage is the manifestation of three or above sequential miscarriages and is one of the great distressing untoward reproductive outcomes influencing about 1% of fertile couples [1, 2]. Fifty percent of cases of recurrent miscarriage are of unknown etiologies, adding to the associated distress. The other 50% of cases are due to a number of identifiable causes: chromosomal, uterine, coagulation, and immunological causes [2, 3]. Increased BMI (obesity), which has been associated with a number of adverse pregnancy outcomes, is of increasing prevalence [4,5]. Several studies revealed an association between obesity and miscarriage [6–8], which may be due to adverse influences on the embryo, the endometrium, or both [9]. From the assessment of evidence from several studies that discuss the relation between miscarriage and obesity, we found that obese females have a significant increased risk of miscarriage regardless of the conception method [10]. Unfortunately, still the influence of obesity on the risk of recurrent miscarriage, and the association between the various degrees of obesity and miscarriage rates has not so far been studied. The aim of this study is to assess the relation and impact of obesity on the risk of miscarriage.

Patients and Methods

Cross sectional study was done in gynecology and obstetrics department in Azadi Teaching Hospital during the period 1st May 2019-1st August 2019. Detailed information was taken from the patient through comprehensive questionnaire including information about obstetrical, medical and surgical history obtained from the patients.

Randomly selected 402 patients in reproductive age were interviewed in the obstetrics and gynecology department.

Recurrent pregnancy loss (RPL), is defined as 3 consecutive pregnancy losses prior to 20 weeks from the last menstrual period [11].

The body mass index (BMI) of all mothers was calculated using the formula (weight in kg/(height in meters)2.

BMI was divided according to the the WHO criteria: underweight <19, normal (19±24.9), over weight (25-29.9), and obese women (BMI >30).

Data entry and analysis was done using SPSS -25. The significance of differences between the groups was analyzed using Chi-square test; and odds ratio used to calculate the risk using logistic regression. $p<0.05$ was considered statistically significant.

Results

The prevalence of recurrent miscarriage was 24(6%), those who had 1-2 miscarriages was 165(41%), as shown in Figure 1.

Recurrent miscarriage was common among those aged ≥31 years 15 (9.9%), followed by 25-30 years 7(5.4%), and < 18 years 1 (3.4%), This relation was statistically significant as shown in Table 1.

Recurrent miscarriage was common among those obese women 10(12.7%), followed by overweight 8(4.5%), and underweight1 (4.3%), respectively. This relation was statistically significant as shown in Table 2.

Recurrent miscarriage was commonly found among those who had ≥5 children 2 (12.5%) than those had 0-1 children 14(6.1) This relation was statistically not significant as shown in Table 3.

Logistic regression of number of abortions shows that risk to have 1-2 miscarriages was significantly 0.3 times more among those aged <18 years than those aged 19-30 years, and those who had 2-4 children 1.6 times than those who had 0-1 child.

Recurrent miscarriage was significantly 3.6 times more among obese women as compared with normal weight women, and 3.2 times more among those aged ≥31, as shown in Table 4.

Table 1: The distribution of patients according to number of miscarriages and age.

Age	Miscarriage			Total
	0	1-2	>3	
<18 year	23	5	1	29
	79.3%	17.2%	3.4%	100.0%
18-24	56	36	1	93
	60.2%	38 .7%	1.1%	100.0%
25-30	64	58	7	129
	49.6%	45.0%	5.4%	100.0%
≥31	70	66	15	151
	46.4%	43.7%	9.9%	100.0%
Total	213	165	24	402
	53.0%	41.0%	6.0%	100.0%

X^2=19.188, df= 6, P value =0.0

Figure 1. The prevalence of abortion

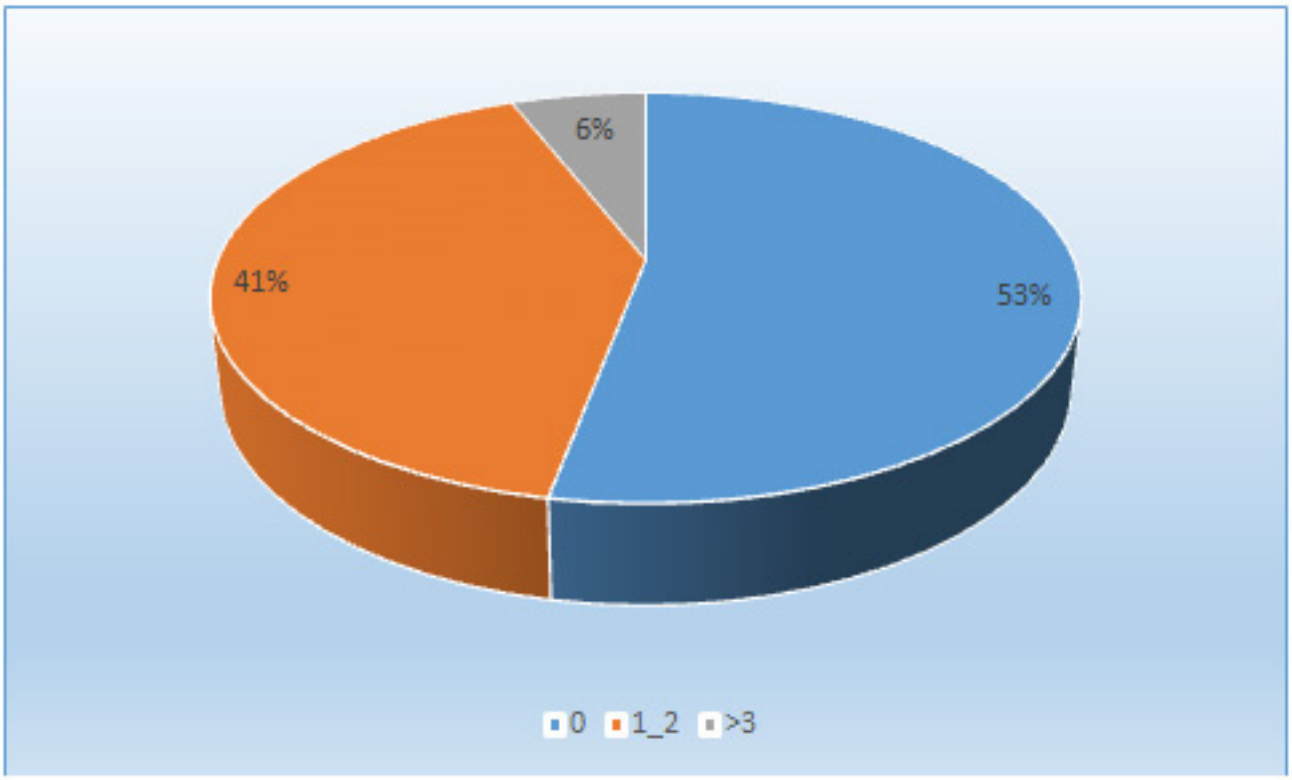

Table 2: The distribution of patients according to number of miscarriages and BMI

BMI	Miscarriage			Total
	0	1-2	>3	
19-24.9	61	55	5	121
	50.4%	45.5%	4.1%	100.0%
<19	10	12	1	23
	43.5%	52.2%	4.3%	100.0%
25-29.9	108	63	8	179
	60.3%	35.2%	4.5%	100.0%
>30	34	35	10	79
	43.0%	44.3%	12.7%	100.0%
Total	213	165	24	402
	53.0%	41.0%	6.0%	100.0%

X^2=14.188, df=6, P value =0.028 Significant

Table 3: The distribution of patients according to number of miscarriages and number of live births

No. of live births	Miscarriage			Total
	0	1-2	>3	
0-1	131	83	14	228
	57.5%	36.4%	6.1%	100.0%
2-4	74	76	8	158
	46.8%	48.1%	5.1%	100.0%
≥5	8	6	2	16
	50.0%	37.5%	12.5%	100.0%
Total	213	165	24	402
	53.0%	41.0%	6.0%	100.0%

X^2=6.5, df=4, P value =0.162 Non Significant

Table 4: The logistic regression of different characteristics and number of miscarriages

Variables	1_2		≥3	
	Sig.	OR	Sig.	OR
BMI				
19-24.9		1		1
<19	0.54	1.331	0.862	1.22
25-29.9	0.075	0.647	0.864	0.9
≥30	0.663	1.142	0.03	3.6
Age				
<18 year	0.012	0.3	0.694	0.7
19-30		1		1
≥31	0.4	1.204	0.012	3.2
No. of live births				
0-1		1		1
2_4	0.025	1.6	0.980	1.012
≥5	0.762	1.2	0.311	2.34

Discussion

The prevalence of recurrent miscarriage was 24(6%), with significant association with OR (3.2) for those aged ≥31. This was higher than found by Jauniaux E et al (2.3%) [12].

In Swedish women the incidence of recurrent miscarriage was (0.05%) in women aged 18-42 years and 650 per 100 000 (0.65%) in women who had achieved pregnancy [13].

Recurrent miscarriage was significantly increased with increasing age, mostly among those aged 31 years and more (9.9%). This goes with previous studies that found the risk of recurrent miscarriage increased with increasing age [14][15]. This may be due to fetal chromosomal abnormality [16,17] .

Recurrent miscarriage was common among obese women 10 (12.7%), 3.6 times increased risk, than non-obese women compared with normal weight women. This was supported by previous studies that found obese women had higher percentage of recurrent miscarriage (59%), with OR 1.7 times more than normal and overweight patients [18].

Boots C E et al found similar results, (16.6%) of obese women had miscarriage, with risk of (1.3) times of having multiple pregnancy loss [19].

In 2004, Lashen et al found that obesity was associated with RPL with OR 3.5 of getting RPL [8].

In a meta-analysis of 16 studies, [10] researchers found significant relation between miscarriage and overweight and obesity, regardless of the method of conception (IVF or normal). The pooled OR of obese women to get RPL was (1.67, 95% CI 1.25–2.25).

In a retrospective study done in England, a significant increased risk of RPL among obese women was documented [20].

The explanation of the association between RPL and obesity may be due to the fact that many endocrine disorders are associated with obesity such as PCOS, diabetes and thyroid disease, all of which are risk factors of RPL [21].

The oocyte quality, embryo development, and endometrial receptivity, which are important in normal conception are controlled by the hypothalamic–pituitary– gonadal hormonal axis. The abnormality of this axis in obese women may be the cause of RPL [22].

In a meta-analysis study, the immunopathological pathways seem to be responsible for pregnancy loss among overweight and obese women. [23].

Many studies have linked the cause to the immunological factor depending on the fact that obesity is associated with high levels of C-reactive protein (CRP) and interleukin-6 (IL- 6) [24-26].

Leptin production stimulates the expression of matrix metalloproteinase by the cytotrophoblast. [27], and modulating the function of local T lymphocytes and proto-oncogenes [28].

Women with RPL had lower serum Leptin levels, and obesity is associated with leptin resistance and deficiency [29, 30].

Conclusion and recommendation

Obesity was significantly associated with increased risk of RPL, therefore it is important to assess the BMI of the patient with RPL and recommend them to decrease weight in order to get better results.

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