Original Article

Frequency of Intrauterine Growth Retardation in Obese Pregnant Females: A Cross Sectional Study in Two Tertiary Care Hospitals of Pakistan

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Abstract

Objectives: To determine the frequency of intrauterine growth restriction in obese women.

The descriptive, cross-sectional study was conducted at Department of Obstetrics & Gynecology, FFH and CMH Rawalpindi from 1st October 2020 to 1st February 2021.

Methodology: A total of 100 pregnant women with gestational age >26 weeks (assessed on LMP) having body mass index BMI >35 kg/m2 and 18 to 40 years of age were included. Patients with multiple pregnancies, CLD, CRF and chronic hypertension were excluded. After this, ultrasonography was done in each woman by the one consultant gynecologist and presence or absence of IUGR was noted.

Results: Age range in this study was from 18 to 40 years with mean age of 31.28 ± 4.09 years. Majority of the women 62 (62.0%) were between 31 to 40 years of age. Mean gestational age was 31.17 ± 2.47 weeks. Mean parity was 3.89 ± 0.91. Mean BMI was 40.38±2.59 kg/m2. Frequency of intrauterine growth restriction in obese women was seen in 18 (18.0%) women.

Conclusion: This study concluded that frequency of intrauterine growth restriction in obese women is quite high which shows obesity as a risk factor for IUGR.

Keywords: Body mass index, obesity, intrauterine growth restriction.

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Introduction

Obesity is defined as increase in body weight due to excessive fat accumulation. It is the most common nutritional disorder in the affluent industrialized and developed world. A generally accepted definition of obesity is a body mass index more than 30kg/m.[1] WHO describe obesity as one of the most blatantly visible, yet most neglected, public health problems that threaten to overwhelm both more and less developed countries. Obesity is a major public health issue and as per WHO, it is a killer disease.[2] The worldwide prevalence of obesity has increased substantially over the past few decades. Economic, technologic, and lifestyle changes have created an abundance of cheap, high-calorie food coupled with decreased required physical activity. We are eating more and moving less.[3] there is evidence for metabolic dysregulation among obese individuals that has been linked with a number of possible environmental factors, including contaminants from modern industry. Obesity is a significant public health concern and is likely to remain so for the foreseeable future. Maternal obesity increases the risk of a number of pregnancy complications, including preeclampsia, gestational diabetes mellitus (GDM), and cesarean delivery.[4]

Excessive weight gain during pregnancy and postpartum retention of pregnancy weight gain are significant risk factors for later obesity in women[5]. Additionally, maternal health can have a significant impact on the in utero environment and, thus, on fetal development and

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the health of the child later in life.[6]Maternal obesity is associated with abnormal fetal growth. Women who are heavier are less likely to have a pregnancy complicated by a small-for-gestational age infant or intrauterine growth restriction, but this protective effect appears to dissipate once the maternal BMI reaches the level of obesity (> 30 kg/m2)[6] The fetus reflects, through nutrition, growth and body composition, the supplies and the energy it receives from the mother, also expressing its dependence on placental function.[6] The fetus also receives a flow of chemical mediators, which inform about the maternal nutritional status and possibly the quality of the postnatal environment. This information contributes to define body composition and size, as well as to structure the endocrine and metabolic systems .[7]

The United Nations Children's Fund reports that the worldwide incidence of low birth weight remained at 15% in the period of 2008-2012, despite the advances in prenatal care. In a study, intrauterine growth restriction was found in 14.50% obese women.[7]As obesity is a risk factor for intrauterine growth restriction and special care is required for a good pregnancy outcome and for the well-being of the mother and fetus. As the obesity goes on increasing in our society which adversely affects the maternal and neonatal outcome in pregnancy, so this study was planned to determine the frequency of intrauterine growth restriction in obese women. Previously very little literature available on this, so my study will not only be useful addition in the existing literature but will also provide the local stats of the problem. Also then based on these results, public awareness can be created regarding this major public health issue among pregnant women as well as treating clinicians for a better future outcome in every aspect to reduce adverse maternal and perinatal outcomes.

Methodology

It is a descriptive Cross-sectional study conducted at Department of Obstetrics & Gynecology, FFH and CMH, Rawalpindi. The duration of study was four months i.e 1st October 2020 to 1st February 2021. Total 100 patients were included in the study. Sample size was calculated by using WHO sample size calculation with following calculation; anticipate population proportion = 14.50%[9], absolute precision required= 7%. Non-probability consecutive sampling was used for sampling purpose. Inclusion Criteria of study included pregnant women age 18-40 years, parity 1-5, gestational age >26 weeks (assessed on LMP) having body mass index BMI >35 kg/m^2 whereas exclusion Criteria included women who have BMI <35 kg/m^2, Multiple pregnancies, Patients with h/o chronic liver disease (assessed on history and s/bilirubin >1.0 mg/dl), women with chronic renal failure (assessed on history and s/creatinine >1.1 mg/dl) and women with chronic hypertension (Systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg, two consecutive measurements at least 4 hours apart). Statistical analysis was performed using SPSS version 20.0. Age, gestational age, parity and BMI were presented as mean and standard deviation. Frequency and percentage were calculated for pregnancy induced hypertension (yes/no), gestational diabetes mellitus (yes/no), place of living (rural/urban), smoking (yes/no), socioeconomic status (poor/middle/upper) and IUGR (present/absent). Effect modifiers like age, gestational age, parity, BMI, pregnancy induced hypertension (yes/no), gestational diabetes mellitus (yes/no), place of living (rural/urban), smoking (yes/no) and socioeconomic status (poor/middle/upper) were controlled through stratifications. Post-stratification chi square was applied to see their effect on frequency of IUGR and p-value ≤0.05 was taken as significant.

Results

Age range in this study was from 18 to 40 years with mean age of 31.28 ± 4.09 years. Majority of the women 62 (62.0%) were between 31 to 40 years of age as shown in Table 1. Mean gestational age was 31.17±2.47 weeks. Mean parity was 3.89±0.91. Mean BMI was 40.38±2.59 kg/m^2. Distribution of women according to the place of living and socioeconomic status, pregnancy induced hypertension, GDM and smoking is shown in Table I.

Frequency of intrauterine growth restriction in obese women was seen in 82 (82.0%) women as shown in table II. Stratification of intrauterine growth restriction with respect to age groups, gestational age, parity, pregnancy induced hypertension, GDM and smoking is shown in Table III respectively.

Discussion

Obesity has a highly negative impact on the general health of contemporary societies. It strongly contributes to significant morbidity and mortality rates caused by numerous conditions, chief among them diabetes mellitus type 2, hypertension, heart disease and some neoplasms. In recent years, the prevalence of overweight and obese individuals has increased in many

Table I: Demographics statistics of variables.		
Variables		Mean±SD, n (%)
Age (years)		31.28±4.09
	18-30	38 (38.0)
	31-40	62 (62.0)
Gestational age (weeks)		31.17±2.47
	27-32	73 (73.0)
	> 32	27 (27.0)
Parity		3.89±0.91
	1-3	38 (38.0)
	4-5	62 (62.0)
Body mass index (kg/m2)		40.38±2.59
	36-40	38 (49.0)
	> 40	62 (51.0)
Residence	rural	56 (56.0)
	urban	44 (44.0)
Socio economic status	poor	23 (23.0)
	middle	55 (55.0)
	upper	22 (22.0)
PIH	yes	47 (47.0)
	no	53 (53.0)
Gestational Diabetes Mellitus	yes	38 (38.0)
	no	62 (62.0)
Smoking	yes	29 (29.0)
	no	71 (71.0)
Intrauterine Growth Restriction	yes	18 (18.0)
	no	82 (82.0)

Table -II: Frequency of intrauterine growth restriction in obese women (n=100).	
	Frequency (%)
Present	82%
Absent	18%

Table III: Comparison of characteristics with Intrauterine Growth Restriction based on p-value				
		Intrauterine Growth Restriction		p-value
		present	absent	
Age	18-30	7	31	0.932
	31-40	11	51	
Gestational Age	27-32	14	59	0.614
	> 32	4	23	
Parity	1-3	7	31	0.932
	4-5	11	51	
BMI	36-40	12	26	0.006*
	> 40	6	56	
Place of living	rural	10	34	0.275
	urban	8	48	
Socio economic status	poor	5	18	0.853
	middle	9	46	
	upper	4	18	
PIH	yes	8	39	0.810
	no	10	43	
GDM	yes	7	31	0.932
	no	11	51	
smoking	yes	6	23	0.655
	no	12	59	

*p<0.05 as level of significance

countries, especially in Europe and the USA. In the USA the percentage of obese people (BMI ≥30kg/m2) has more than doubled in the last 20-30 years, from 12.8% in 1976 to 27% in 1999.[8]

Obesity also affects women in the reproductive age and the percentage of obese mothers in Europe ranges from 8-19%. A growing number of studies has concluded that maternal obesity is a significant risk factor of pregnancy complications, both for a mother and a child.[9] As far as mothers are concerned, the most threatening medical complications include gestational diabetes, hypertension, thromboembolism, complications of labor and the necessity of a cesarean section. There is a notably increased rate of cesarean deliveries in the group of obese mothers. An adverse pregnancy outcome of the offspring results from macrosomia, intrauterine growth restriction (IUGR), unexplained stillbirth and congenital anomalies. There is an increased rate of congenital anomalies in this group of newborns.[10]

I have conducted this study to determine the frequency of intrauterine growth restriction in obese women. Age range in my study was from 18 to 40 years with mean age of 31.28 ± 4.09 years. Majority of the women 62 (62.0%) were between 31 to 40 years of age. Frequency of intrauterine growth restriction in obese women was seen in 18 (18.0%) women. The United Nations Children's Fund[11] reports that the worldwide incidence of low birth weight remained at 15% in the period of 2008-2012, despite the advances in prenatal care. In a study,[12] intrauterine growth restriction was found in 14.50% obese women.Previous studies have investigated the association between maternal obesity and fetal growth, but results have been contradictory. Increased risks for both fetal macrosomia and intrauterine growth restriction (IUGR) have been reported.[13-14] In a study, fetal weight of DIO dams was significantly reduced, and a clear association between maternal obesity and an increased the risk for IUGR were shown.[15]Fikree and Berendes[16] observed a significant correlation between low maternal weight less than 50kgs and IUGR with OR 2.6 and attributable risk of 38.9% as compared to maternal weight equal or more than 50 kgs with OR >1.0, which is also seen in different other studies.[17-18] A prospective study from China revealed an association between prepregnancy BMI and birth weight. Infants born to women who were severely underweight before pregnancy with BMI <18.5 were of increased risk of IUGR as compared to normal maternal BMI.[19]Fox et al[20] highlighted the difficulty of clinical fetal

weight estimation in women with increased BMI (≥30), while Goetzinger et al[21] also demonstrated low detection rates of fetal growth abnormalities using clinical estimation across a wide spectrum of BMI categories. Although fetal macrosomia and obesity is a logical association, IUGR is often overlooked in these patients. Maternal obesity is a recognized risk for IUGR,[22] being associated with increased risks of perinatal mortality, birth adaptation complications, respiratory distress and necrotizing enterocolitis.[23] In the index study the incidence of IUGR was quite high in obese women. This is in contrast with a recent meta-analysis that indicated a decreased risk of low birth weight (relative risk 0.84; 95% CI 0.75 - 0.95) in overweight and obese women. The meta-analysis did show an increased risk of extremely low birth weight infants in the 'heavier' woman (for obese OR 1.43;95% CI 1.05 - 1.95, and for 'very obese' OR 1.98; 95% CI 1.36 - 2.89).[23]

Conclusion

This study concluded that frequency of intrauterine growth restriction in obese women is quite high which shows obesity as a risk factor for IUGR. So, we recommend that public awareness programs should be arranged on local and national levels regarding this major public health issue among women of reproductive age group as well as treating clinicians for a better future outcome in every aspect to reduce adverse maternal and perinatal outcomes.

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