

Pregnancy with Obesity -A Risk Factor for PIH

Shabnam Shamim Asim, Humaira Naeem

ABSTRACT

OBJECTIVE: To compare the frequency of pregnancy induced hypertension (PIH) between obese and non-obese women.

STUDY DESIGN: Comparative study

PLACE AND DURATION OF STUDY: Antenatal Clinic and Obstetrics Ward of Abbasi Shaheed Hospital, Karachi from 1st January 2008 to 30th June 2008.

METHOD: A total of two hundred gravid women were selected by non-probability purposive sampling. Inclusion criteria were pregnant women with singleton pregnancy and gestational age from 24 to 40 weeks.

Two groups were formed having hundred women each. Group A formed of non-obese (B.M.I<30) and group B of obese (B.M.I≥30). Blood pressure was recorded with mercury sphygmomanometer and woman having diastolic pressure of >90-mmHg or systolic pressure of >140-mmHg, two readings 4 hours apart were diagnosed as PIH.

Frequency and percentage were computed for categorical variables like age groups, gravida, family history, patients with pregnancy-induced hypertension. Chi-Square test was used to compare proportion of patients with pregnancy-induced hypertension between obese and non-obese women. Mean with standard deviation, 95% confidence interval of mean were also computed for quantitative variables like age, parity, gestational age, height, weight, BMI, systolic and diastolic blood pressure by applying t-test to compare mean difference between obese and non-obese.

RESULTS: The frequency of PIH was found to be higher in obese women as compared to non-obese patients. The overall PIH was 67 out of 200 (33.5%). PIH was present in 41% of obese women and in 26% of non-obese women. P-value=0.025 indicate that pregnancy induced hypertension was two times more likely in obese women than non-obese women (OR= 1.98, 95% CI= 1.09 to 3.59).

CONCLUSION: The results of this study indicate that frequency of PIH is higher in patients belonging to group B who were obese.

KEY WORDS: Pregnancy induced hypertension, Body mass index, Obesity, Pregnancy.

INTRODUCTION

Obesity is an abnormal accumulation of body fat. Obesity occurs when energy intake repeatedly exceeds energy expenditure. Its precise etiology is unknown but genetic, metabolic endocrine, psychological and cultural factors are involved. According to the recommendations of World Health Organization (WHO), obesity is defined as body mass index (BMI) of 30 kg per meter square or more.¹ Prevalence of obesity is rising to epidemic with proportions around the world which include woman of child bearing ages¹. Obese women are at an increased risk of development of pregnancy induced hypertension. One large cohort study implies that relative to non-obese women, there was 1 excess case of PIH per 10 moderately obese women and 1 per 7 severely obese women². Hypertensive disorders including pre-existing hypertension and pregnancy induced hypertension are more common in women with excess weight, although prevalence rate in different reports vary widely (7-46 %)².

Pregnancy induced hypertension is defined as woman having diastolic pressure of >90 mmHg or systolic pressure of >140 mmHg two readings 4 hours apart ,or a single reading of diastolic >110 mmHg after 20 weeks of pregnancy³.

Obesity causes more complications in pregnancy and childbirth. Epidemiological studies have shown that maternal obesity causes adverse pregnancy outcomes resulting in maternal complications (Gestational diabetes mellitus, hypertension, pre-eclampsia)⁴, labor and delivery complications⁵, fetal and neonatal death⁶, birth defects - especially Neural tube defects (NTDs)⁷ and delivery of large-for-gestational age (LGA) infants⁵. Much work has been done on this topic internationally but the local data is still deficient.

The purpose of this study is to compare the frequency of PIH in obese versus non-obese women in our set up and to evaluate if obesity is a significant risk factor for PIH, so that during prenatal and antenatal period

the patients could be counseled with evidence based practice to optimize their BMI before pregnancy.

MATERIAL AND METHOD

This observational comparative study was conducted at the Antenatal Clinic and Obstetric Ward in Abbasi Shaheed Hospital, Karachi, from January 1st, 2008 to June 30th, 2008. A total of two hundred gravid women were selected by non-probability purposive sampling after taking informed consent for the study. Inclusion criteria were pregnant women with singleton pregnancy and gestational age from 24 to 40 weeks. The exclusion criteria were woman with BMI less than 20 (who were considered underweight), patients with history of pre-existing hypertension, chronic renal disease, diabetes mellitus or any other associated medical disorder. BMI was calculated for each women using the formula: weight (in kilogram) divided by height (in meters) squared.

Two hundred pregnant women were divided in two groups - Group A comprised of 100 women who were non-obese (BMI <30) while Group B comprised of 100 obese women (BMI ≥30). Women were informed about the risk of PIH associated with Obesity and importance of its detection and management. Besides routine antenatal workup, patient's history regarding her age, parity, gestational age, family history of diabetes and hypertension (only in first degree relatives) and adverse past obstetrical history was taken. Each of these groups had separate data for age and parity of the patients. A joint team approach, with an obstetrician and a dietician was adapted to manage obesity during pregnancy and the weight gain was kept between 0.5 to 1 kg by giving dietary advices.

Blood pressure was recorded using mercury sphygmomanometer with appropriate sized cuff.

Data was recorded in a proforma including patient's age, parity, gestational age, height, weight, BMI and blood pressure. PIH was diagnosed in patients whose blood pressure was more than or equal to 140/90 mmHg recorded at two occasions at least 4 hours apart or a single reading of diastolic 110 mmHg. These women were managed according to local protocols including antihypertensive medication for PIH.

Data Analysis Procedure

All statistical analysis was done using SPSS version 10 for Window. Frequency and percentage were computed for categorical variables like age groups, gravida, family history, patients with pregnancy-induced hypertension. Chi-Square test was used to compare proportion of pregnancy-induced hypertension be-

tween obese and non-obese women. Mean with standard deviation, 95% confidence interval of mean were computed for quantitative variables like age, parity, gestational age, height, weight, BMI, systolic and diastolic blood pressure. By applying t-test to compare mean difference between obese and non-obese women for age, parity, gestational age, height, weight, systolic and diastolic blood pressure. P≤0.05 was considered significance.

RESULTS

The age distribution of patients is shown in **Figure I**. The mean±SD age of the patients was 30.23±5.9 years (95%CI: 29.40 to 31.05). mean±SD, 95% confidence interval, median with IQR and minimum and maximum observation of gravida, gestational age, height, weight, BMI, systolic and diastolic blood pressure are presented in **Table I**. Gravida distribution of the women is presented in **Figure II**.

Comparisons of characteristics of patients between obese and non-obese patients are presented in table II. mean±SD age, gravida, gestational age and systolic blood pressure were not significant between groups while height, weight and diastolic blood pressure were statistically significant between groups. Mean diastolic blood pressure was significantly high in obese patients than non-obese patients. Overall frequency of pregnancy induced hypertension (PIH) was 67 out of 200 (33.5%). Frequencies of PIH in obese and non-obese patients are presented in **Table III**. P-value=0.025 indicate that pregnancy induced hypertension was 2 times more likely in obese women than non-obese women (OR=1.98, 95%CI: 1.09 to 3.59).

FIGURE I:
AGE DISTRIBUTION OF THE PATIENTS (n=200)

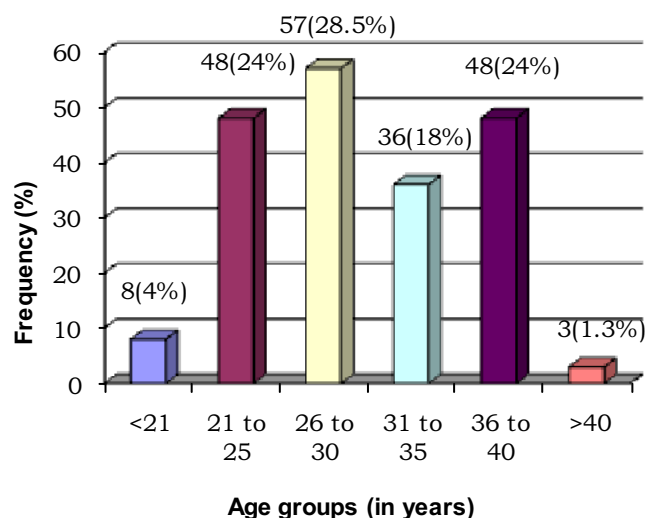
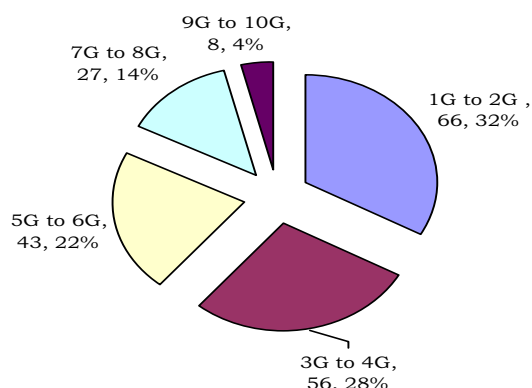


TABLE I: DESCRIPTIVE STATISTICS OF CHARACTERISTICS (n=200)

Variables	Mean±SD	95% CI	
		Lower Bound	Upper Bound
Age (Years)	30.23±5.9	29.40	31.05
Gravida	3.99±2.4	3.65	4.32
Gestational Age(Weeks)	30.22±2.9	29.81	30.63
Height (cm)	154.88±3.9	154.34	155.41
Weight (Kg)	70.57±5.88	69.74	71.39
Body Mass Index	29.48±2.96	29.07	29.90
Blood Pressure Systolic	120.05±23	116.84	123.26
Blood Pressure Diastolic	75.85±15.5	73.68	78.02

FIGURE II: DISTRIBUTION OF GRAVIDA



DISCUSSION

Obesity is an increasing problem globally; populations in poor countries as well as affluent ones are at risk. Obesity has a major impact on pregnancy outcome. It is an important medical problem effecting both mother

TABLE III: FREQUENCY COMPARISON OF PREGNANCY INDUCED HYPERTENSION BETWEEN OBESE AND NON-OBESE WOMEN

Obesity	Pregnancy Induced Hypertension		P-Values	OR (95% CI)
	Positive	Negative		
Obese (n=100)	41	59	0.025	1.95 (1.8 to 3.59)
Non-Obese (n=100)	26	74		

and baby. The epidemic rise in obesity helped bring the issue to the forefront. The prevalence of obesity varies worldwide due to different geographical and ethical backgrounds. Reports of obesity among pregnant women in the USA range from 18.5% to 38.3%, making it one of the most frequent high-risk obstetric situations⁸.

Factors responsible for obesity in South Asia and poor countries may include poor dietary habits and lack of knowledge about the nutritional values of food. Carbohydrate based food is cheap and the most commonly used diet in our population. Moreover, large quantities of fat are used to add taste to the food. During pregnancy, improper dietary habits are further accentuated with a customary ideology of food for two. Excessive eating of a diet with poor nutritional and caloric value puts a pregnant woman at an exaggerated risk of obesity during pregnancy.

Several studies in western world have shown that obesity is associated with adverse pregnancy outcomes^{9,10}. Among pregnancy complications, gestational diabetes mellitus and pregnancy induced hypertension are significantly more common in obese women. These facts are also supported by a population-based study conducted in Canada comparing pre-

TABLE II: COMPARISON OF CHARACTERISTICS BETWEEN OBESE AND NON-OBESE PATIENTS

Variables	Non-Obese		Obese		P-values (t-test)
	Mean	Std. Deviation	Mean	Std. Deviation	
Age	30.11	5.597	30.34	6.184	.783
Gravida	3.92	2.390	4.05	2.376	.700
Gestational Age	30.09	2.804	30.35	3.036	.530
Height	156.81	3.887	152.94	2.726	.0005
Weight	65.68	3.396	75.45	3.128	.0005
Blood Pressure Systolic	117.50	20.956	122.60	24.726	.117
Blood Pressure Diastolic	73.60	14.321	78.10	16.434	.040

pregnant BMI categories with obstetrical and neonatal outcomes¹¹. In this study increasing pre-pregnancy BMI category was associated with an increasing risk of adverse pregnancy outcomes such as gestational hypertension, gestational diabetes, caesarian section, shoulder dystocia, birth injuries and macrosomia. The results of our study match with the above international studies, but we limit ourselves to observe only one factor which was pregnancy induced hypertension.

A study conducted in Australia¹² to assess the prevalence and impact of overweight and obesity shows that hypertensive disorders of pregnancy and gestational diabetes as well as increased neonatal morbidity is more common in obese women. It was concluded that increasing BMI was associated with maternal and neonatal outcomes that may increase the cost of obstetric care. Their results regarding hypertensive disorder of pregnancy were consistent with the results of our study.

A cohort study was conducted in USA from 1999 to 2002¹³. Women were placed in standard BMI categories. Increased BMI category was associated with increased risk of complications including PIH. The results matched with our study as it also showed that obesity increases the risk of PIH. Another cohort study conducted in Norway observed the adverse pregnancy outcome in overweight urban women¹⁴. It concluded that overweight women are more prone to develop hypertension during pregnancy. These findings are also consistent with this study in which increased maternal weight increases the risk of PIH. A multi-center study conducted in New York¹⁵ concluded that obesity is an independent risk factor for adverse obstetric outcomes including gestational hypertension. The results of our study also indicate that frequencies of PIH are higher in patients belonging to group B who were obese. Our findings are consistent with this and the other above mentioned international studies but population based local studies in our country are lacking, and therefore the magnitude of this problem in our country is unfortunately not known.

There were certain limitations in this study such as the number of subjects was limited and a single hospital could not represent the entire population. Large multi-centric trials are required for better estimation of the risks of obesity in our country. In short, time has come for a population based research program to identify obesity as a pre-pregnancy antecedent of high risk pregnancy in Pakistani women also. This will provide opportunity to screen population at risk so that timely anticipation of antenatal complications can be done. It will prevent and reduce both maternal and fetal complications.

CONCLUSION AND RECOMMENDATIONS

This study concluded that pregnancy with obesity is associated with increased risk of PIH. In view of the results of this study, best practices at obesity prevention, treatment and optimal weight maintenance must be identified to provide practitioners with an array of strategies to help curb the ensuing epidemic.

The health professionals, who can target obese women of childbearing age, need greater awareness. The attention of the obstetrician must be directed towards pre-conceptual counseling in order to limit the weight gain within optimum limits before and during pregnancy. Interventions should be targeted to address obesity during adolescence, pregnancy and the postpartum or inter-conceptual periods.

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AUTHOR AFFILIATION:

Dr. Shabnam Shamim Asim (*Corresponding Author*)

Associate Professor
Department of Gynecology & Obstetrics
Karachi Medical & Dental College
Karachi, Sindh-Pakistan.
Email: shabnam_s.asim@hotmail.com

Dr. Humaira Naeem

Department of Gynecology & Obstetrics
Karachi Medical & Dental College
Karachi, Sindh-Pakistan.