

Frequency of Pre-Eclampsia in Obese Patients

SAMIEA PARVEEN¹, SAMINA MUMTAZ², SAIMA GUL BASHIR³

ABSTRACT

Aim: To determine the frequency of pre-eclampsia in obese patients.

Methods: This descriptive study was carried out in the Department of Obstetrics and Gynecology Unit III, Nishtar hospital Multan from November 2011 to February 2012 and May 2012 to August 2012. Subjects were selected from clinically diagnosed pregnant ladies fulfilling the inclusion criteria in the Department of Obstetrics and Gynaecology, Nishtar Hospital Multan.

Results: Age at presentation of the obese women was highest in the age group 20–24 years i.e. 44(36.0%). Mean age of the women was 26.64±4.52 years with age range of 20–38 years. There were 10(8.2%) primigravida, 26(21.3%) nullipara, 79(64.8%) women were para 1–4 and 7(5.7%) para 5 or above. In our study, frequency of pre-eclampsia in obese was 23.8%; (29/122) women developed pre-eclampsia.

Conclusion: Frequency of pre-eclampsia in obese was 23.8% in present study which seem to be quite high.

Keywords: Obesity, pre-eclampsia, body mass index

INTRODUCTION

Obesity is a worldwide individual and public health issue because it contributes to development of several chronic diseases¹. The rate of obesity in general population is increasing dramatically with up to 40% women in the UK being overweight². In the United States, the prevalence of overweight women of 20–29 years of age increased from 12% in 1971 to 1974, up to 20% in 1988-1991³. Similarly in general population its prevalence is 15–20%⁴. Body mass index (BMI) is the most widely accepted measure of obesity in adults⁵ which is measured as:

Body mass index = $\frac{\text{Weight in kilograms}}{\text{Height in meter}^2}$

A normal BMI is 20–24 kg/m².

Overweight is defined as a BMI of 25–29.9 kg/m².

Obesity is a BMI ≥ 30 kg/m².

Class I obesity is a BMI of 30–34.9 kg/m².

Class II obesity is a BMI of 35–39.9 kg/m².

Class III obesity is BMI of > 40 kg/m².

Obesity is considered as independent risk factor for development of pre-eclampsia⁷ which is a complex polygenetic trait and is multifactorial⁸. According to WHO, the incidence of pre-eclampsia is seven fold higher in developing countries as compared to developed countries⁹ and is one of the cause for high fetomaternal morbidity¹⁰. It has been reported that obese women have 8.7% incidence of pre-eclampsia¹¹ while in one local study the frequency of pre-eclampsia has been reported 35% in obese patients¹².

According to WHO definition, overweight women have two fold increased risk and obese women have 3.2-fold risk of developing pre-eclampsia when compared with women of normal weight¹³. Risk of pre-eclampsia rises by 0.54% for each 1 kg/m² increase in BMI and doubles with each 5–7 kg/m² increase in body mass index⁷. At BMI of 17 kg/m² there is 57% reduction in risk of pre-eclampsia and at BMI of 19 kg/m² there is 33% reduction in risk of pre-eclampsia¹⁴.

Obesity increases the risk of pre-eclampsia through insulin resistance¹⁵, hyperlipidemia¹⁶ and systemic inflammation¹⁷.

During pregnancy there is threefold increase in triglyceride levels and 50% increase in low density lipoprotein (LDL) and high density lipoprotein (HDL)¹⁸. This increase in triglyceride and very low density lipoprotein (VLDL) is positively correlated with mother's BMI and induces vascular damage by endothelial oxidation. Leptin concentration determined by the degree of adiposity rises three fold during pregnancy and correlated with mother's BMI¹⁸.

It has been highlighted that obesity is an important public health issue. There is a strong association between raised maternal BMI and a number of threatening complications during pregnancy including pre-eclampsia. So, pregnancies among obese women must be classified as high risk pregnancies and appropriate antenatal care should be provided.

MATERIAL AND METHODS

This descriptive study was carried out in the Department of Obstetrics and Gynecology Unit III, Nishtar hospital Multan from November 2011 to

^{1,2}Dept of Obs&GynaeNishtar Medical College, Multan,

³Consultant Gynaecologist, Indus Hospital, MuzaffarGarh.

Correspondence to Dr.SamieaParveen Email: drsamieaasif@gmail.comCell: 03317094678

February 2012 and May 2012 to August 2012. Subjects were selected from clinically diagnosed pregnant ladies fulfilling the inclusion criteria in the Dept of Obs.&Gynaecology, Nishtar Hospital Multan.

RESULTS

There were 106(86.9%) women having gestational amenorrhea of 24–36 week, 16(13.1%) women with gestational age of 37–40 week. In our study, frequency of pre-eclampsia in obese was 23.8%; (29/122) women developed pre-eclampsia. Out of total 106 women having gestational age of 24–36 weeks, 20(18.9) and out of 16 women of gestational age 37–40 week, 9 women (56.3%) developed pre-eclampsia. Gestational age had no significant effect on development of pre-eclampsia (p=0.191).

Age at presentation of the obese women was highest in the age group 20–24 years i.e. 44(36.0%), followed by 41(33.6%) patients who were between 25–29 years of age (Table1). There were 10(8.2%) primigravida, 26(21.3%) nullipara, 79(64.8%) women were para 1–4 and 7(5.7%) para 5 or above (Table-2). Mean weight of the women was 73.75±3.09 kg and mean height was 1.52±0.02 m and mean of the BMI was 31.74±1.01 kg/m² as shown in Table-3. Out of 44 patients between 20–24 years, there were 11(25%) women having pre-eclampsia while 7(17.1%) patients out of total 41 obese between 25–29 years developed pre-eclampsia as mentioned in Table-4. Age had no significant effect on development of pre-eclampsia (p=0.326). Out of total 10 primigravida, 1(10%) developed pre-eclampsia. (Table-5). Parity had no significant effect on development of pre-eclampsia (p=0.739).

Table-1: Age Distribution (n=122)

Age (years)	n	%age
20-24	44	36.0
25-29	41	33.6
30-34	34	27.9
35-39	03	02.5

Table2:Parity Distribution (n=122)

Parity	n	% age
Primigravida	10	08.2
Nullipara	26	21.3
Para 1-4	79	64.8
Para >5	07	05.7

Table3: Descriptive Statistics (n=122)

Variable	Mean	SD
Age (years)	26.64	4.52
GA (weeks)	33.09	3.72
Weight (kg)	73.75	3.09
Height (m)	01.52	0.02
BMI (km/m ²)	31.74	1.01

Table4:Age Distribution of obese patients in relation to outcome

Age (years)	n	Women with preeclampsia	%age
20-24	44	11	25.0
25-29	41	07	17.1
30-34	34	09	26.5
35-39	03	02	66.7

Table-5:Parity distribution of obese patients in relation to outcome

Parity	n	Women with preeclampsia	%age
primigravida	10	01	10.0
Nullipara	26	06	23.1
Para 1-4	79	20	25.3
Para ≥5	07	02	28.6

DISCUSSION

The prevalence of overweight and obesity have substantially increased in the last decades, especially in women. The rising rate of obesity is a major public health concern in the West, where 28% of pregnant women are overweight and 11% are obese. In industrialized countries, one in five women booking for antenatal care is obese¹⁹. The World Health Organization characterizes obesity as a pandemic issue, with a higher prevalence in females than males²⁰. Thus many pregnant patients are seen with high body mass index (BMI). Obesity is a chronic condition that predisposes patients to multiple serious health disorders and premature deaths²¹.

Obesity during pregnancy is considered a high-risk state because pregnancies in obese women are characterized by a high incidence of maternal complications including hypertensive disorders²². Because of those complications; cesarean sections rate is higher in obese women than in lean women.

Present study was conducted to find the frequency of pre-eclampsia in obese pregnant women. Mean age of the patients was 26.64±4.52 years. Majority of the patients 79(64.8%) were para 1–4. Frequency of pre-eclampsia in obese patients was 23.8%. Our results are comparable with international literature. Asim et al have reported that frequency of PIH was found to be higher in obese women as compared to nonobese patients²³. 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.

Yazdani et al determined the effect of maternal body mass index on pregnancy outcome and found that pre-eclampsia developed in 5(3.9%) patients in BMI > 20, in 19 patients (4.6%) in BMI 20–24.9, in 31 patients (8.7%) in BMI 25–29.9, and 12(12.2%) in

30–34.9 and in 2(3.33%) in patients < 35²⁴.

Our study is a hospital based with a small sample size and no controls and cannot represent the true risk of pre-eclampsia in obese population so, further multicentre studies are needed.

CONCLUSION

Incidence of pre-eclampsia was 23.8% in our study which seems to be high and showing an alarming situation for future. Obesity in pregnancy should be regarded as a high risk state because of its association with adverse obstetric outcome.

REFERENCES

1. Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP. The spread of the obesity epidemic in the United States, 1991–1998. *JAMA*.1999;282:1519–22.
2. Keil U, Kuulasmaa K. WHO MONICA Project: risk factors. *Int J Epidemiol*. 1989;18:46-55.
3. Kuczmarski RJ, Flegal KM, Campbell SM, Johnson CL. Increasing prevalence of overweight among US adults. *JAMA*.1994;272:205-11.
4. Jaleel R. Impact of maternal obesity on pregnancy outcome. *J Surg Pak (International)*. 2009;14:2-6.
5. Najam I. Obesity: An epidemic of 21st century. *J Pak Med Assoc*. 2005;55:118-22.
6. Wildschut HIJ. Prepregnancy antecedents of high risk pregnancy. James DK, Steer PJ, Weiner CP, Gonik B, editors. *High risk pregnancy: management options*. Philadelphia: WB Saunders; 2006. p. 1-37.
7. O'Brien TE, Ray JG, Chan WS. Maternal body mass index and the risk of preeclampsia: a systematic overview. *Epidemiology*.2003;14:368–74.
8. Mumtaz F, Memon AR, Yousfani S, Tahir SM, Khushk I, Memon M, et al. Role of serum leptin level as a marker of severity of pre eclampsia. *J Ayub Med Coll Abbottabad*. 2008;20(1):13-5.
9. Abubakar A, Abdullahi RA, Jibril HZ, Dauda MH, Poopola MA. Maternal ethnicity and severity of pre-eclampsia in Northern Nigeria. *Asian J Med Sci*. 2009;1(3):104-7.
10. Vanderjagt DJ, Patel RJ, El-Nafaty AU, Melah GS, Crossey MJ, Glew RH. High-density lipoprotein and homocysteine levels correlate inversely in pre-eclamptic women in northern Nigeria. *ActaObstetGynecol Scand*. 2004;83(6):536-42.
11. Mbah AK, Kornosky JL, Kristensen S, August EM, Alio AP, Marty PJ, et al. Super-obesity and risk for early and late pre-eclampsia. *BJOG*.2010;117:997–1004.
12. Choudhry H, Choudhry A, Azam N, Jan S. Effects of obesity on pregnancy and its outcome. *Pak Armed Forces Med J* 2009; 4:32-3.
13. Leeners B, Rath W, Kuse S, Irawan C, Imthurn B, Neumaier-Wagner P. BMI: new aspects of a classical risk factor for hypertensive disorders in pregnancy. *ClinSci (Lond)*. 2006; 111:81-6.
14. Bodnar LM, Ness RB, Markovic N, Roberts JN. The risk of pre-eclampsia rises with increasing pregnancy body mass index. *Ann Epidemiol*. 2005;15:475-82.
15. Solomon CG, Seeley E. Brief review: hypertension in pregnancy. *Hyperten*.2001;37:232-3.
16. Ray JG, Diamond P, Sing G, Bell CM. Brief overview of maternal triglycerides as a risk factor for pre-eclampsia. *Br J ObstetGynaecol*.2006;113:379-86.
17. Wolf M, Kettege E, Saunder L, Leffrey L. Obesity and pre-eclampsia. *ObstetGynaecol*. 2001;98:757-62.
18. Pipkin FB. Maternal physiology in pregnancy. In: Chamberlain G, Steer PJ, editors. *Turnbull's obstetrics*. London: Churchill Livingstone; 2002. p. 71-92.
19. Vasudevan C, Renfrew M, McGuire W. Fetal and perinatal consequences of maternal obesity. *Arch Dis Child Fetal Neonatal Ed*. 2011;96(5):378-82.
20. Satpathy HK, Fleming A, Frey D, Barsoom M, Satpathy C, Khandalavala J. Maternal obesity and pregnancy. *Postgrad Med* 2008;120:1-9.
21. Islam N. Obesity: an epidemic of the 21st century. *J Pak Med Assoc* 2005;55:118-22.
22. Galtier-Dereure F, Bringer J. Obesity and pregnancy. *Ann Endocrinol (Paris)* 2002;63:470-5.
23. Asim SS, Naeem H. Pregnancy with obesity - a risk factor for PIH. *J LiaquatUni Med Health Sci* 2010;9(03):125-9.
24. Yazdani S, Yosofniyapasha Y, Nasab BH, MojaveriMH, BouzariZ. Effect of maternal body mass index on pregnancy outcome and newborn weight. *BMC Research Notes* 2012;5: 34-7.