Original Article

Prevalence of Recurrence of Pre-Eclampsia and its Association with Raised Body Mass Index in Multiparous Women

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Abstract

Objective: In this study, we assessed BMI as a risk factor for recurrent preeclampsia so that proper counseling and antenatal care would be given in order to provide a good outcome in subsequent pregnancies.

Methodology: This descriptive prospective cross-sectional study was conducted in Department of Obstetrics and Gynecology, Unit III, over a period of 1st April 2014 to 30th October 2014. A total of 193 women with previous history of pre-eclampsia at >20 weeks assessed through previous pregnancy records included discharge records/antenatal cards and from history were included in this study. BMI was calculated and BMI ≥25 kg/m2 was labeled as raised BMI.

Results: Frequency of recurrent preeclampsia in multiparous women was observed in 35.23% (68/193) and frequency in multiparous women with raised BMI (≥25kg/m^2) was 73.5 %(50/193). Recurrent preeclampsia was significantly high in women with raised BMI (≥25kg/m^2).

Conclusion: It is concluded that there is a high frequency of recurrent preeclampsia in multiparous women which may not only compromise a woman's health but may also affect her decision to have more children. Pre-pregnancy BMI is also an important predictor of recurrent preeclampsia.

Key Words: Preeclampsia, Raised BMI, Multiparous women.

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Introduction

Preeclampsia is a major cause of maternal and perinatal mortality as well as morbidity. It's an idiopathic disorder of pregnancy with increased chances of a recurrence if patient have a raised body mass index. Preeclampsia is defined as "diastolic blood pressure ≥ 90 or systolic blood pressure ≥ 140 mmHg on two occasions, 4-5 hours apart in combination with proteinuria (defined as 1+ 0.3gm/ lit or more on a proteinuria dipstick test, or protein/creatinine ratio of 30mg/mmol or more in a random sample, or a urine protein excretion of 300mg or more for 24 hours after 20 weeks of pregnancy and resolving completely by 6th postpartum week.[1, 2]

Preeclampsia is a major cause of maternal and perinatal mortality as well as morbidity. It causes 15% of all direct maternal deaths in UK and 5 folds increase in perinatal mortality.[2] Recent estimates indicate that over 63000 women die each year

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worldwide because of preeclampsia and due to its complications, with 98% of these occurring in developing countries.[3]

It's an idiopathic disorder of pregnancy having multiple risk factors which are associated with increased risk of pre-eclampsia and their presence is an alarming sign of recurrent pre-eclampsia, like advanced age, family history of pre-eclampsia (in either mother or sister increase the risk of preeclampsia four to eight folds), previous history of pre-eclampsia, raised BMI at first visit, increasing birth interval more than 10 years.[4]

It is well known that women having a previous pregnancy complicated by pre-eclampsia have an increased risk for recurrence in subsequent pregnancies and the significant maternal and fetal complications are more common in recurrent pre-eclampsia compared with an initial episode.[5] According to Swedish retrospective cohort study investigated the risk of preeclampsia in first and subsequent pregnancies shows a recurrence risk of preeclampsia was 14.7%. [6]

According to a study, history of early-onset preeclampsia is a stronger predictor for the recurrence of preeclampsia than late onset event, particularly for early-onset recurrence.[6] Family history of preeclampsia in either mother or sister increases the risk up to 4-8 folds.[7]

Obesity is a definitive risk for preeclampsia. The risk of preeclampsia typically doubles with each 5 to 7 kg/m2 increases in pre-pregnancy MI.[8] According to a retrospective cohort study conducted in the USA investigated the effect of BMI on recurrence of preeclampsia shows that obese and overweight women had a higher risk of recurrent preeclampsia (19.3% and 14.2%). [9]

The rationale of this study is to assess BMI and multiparity as a risk factor for recurrent preeclampsia and to see this relationship so that proper counseling and antenatal care would be given in order to provide a good outcome in subsequent pregnancies. No local study is available in Pakistan to assess this relationship in our population.

Methodology

This descriptive cross-sectional study was carried out in the Department of Obstetrics and Gynaecology, over a period of 1st April 2014 to 30th October 2014. A sample size of 193 patients was calculated by the taken prevalence of 14.2%,[6] 95% confidence level with an absolute precision of 5%.

All multiparous pregnant women admitted through emergency and inward fulfilling the inclusion criteria were included after informed consent. The previous history of preeclampsia at >20 weeks assessed through previous pregnancy records included discharge records/ antenatal cards and from history.

Pregnant women with Pre-existing medical conditions like chronic hypertension, diabetes mellitus, autoimmune disorders, thrombophilias, connective tissue diseases and liver or renal diseases and malignancies were excluded. Patients who were primigravida and with multiple gestations were also not included in this study.

Data Collection Procedure: All patients with diagnosed preeclampsia were included in this study. The diagnosis was confirmed by standard defined criteria. Their previous history regarding preeclampsia in previous pregnancy was evaluated, from their previous pregnancy records including discharge cards, antenatal cards and past history. BMI was calculated and BMI ≥25 was labeled as raised BMI.[9] All the demographic influences were entered into the predesigned proforma.

Data Analysis Procedure: Data was analyzed through SPSS version 22. Mean and standard deviation were calculated for age, gestational age, the time period from last parity to current and BMI. Frequency and percentage were calculated for recurrent preeclampsia and obese and overweight. Stratification of age, gestational age, parity and time period from last parity to current was done to see the effect of these on the outcome variable. Post-stratification applying chi-square test taking p less than equal to 0.05 as significant.

Results

There were 102 of 193 (52.85%) women age between 20 to 30 years and 80 of 193 (41.45%) women were between 31 to 40 years while only 11 (5.7%) patients were below 20 years. The average age of the women was 28.59±5.31 years similarly mean gestational age, the time period from last parity to current and body mass index of the women is also shown in Table I.

Regarding parity of the women, 74.61% women had 2 to 3 children and 25.39% had more than three

Table I: Descriptive Statistics of Study Patients (n=193)

	Statistic					
	Mean	95% Confidence Interval for Mean		Median	Std. Deviation	Interquartile Range
		Minimum	Maximum			
Age (Years)	28.59	27.84	29.35	29	5.31	9
Gestational Age (weeks)	27.78	27.16	28.40	26	4.38	7
Time period from last parity to current in years	1.73	1.59	1.87	2	.96	1
BMI (kg/m^2)	25.17	24.46	25.87	24.1	4.97	9.9

children as shown in figure 1. Out of 193 women, 54(27.98%) had obese and 32(16.58%) were overweight as presented in figure 2.

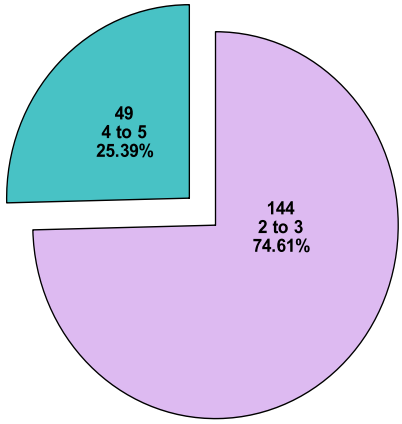

Figure 1. Parity distribution (n=193)

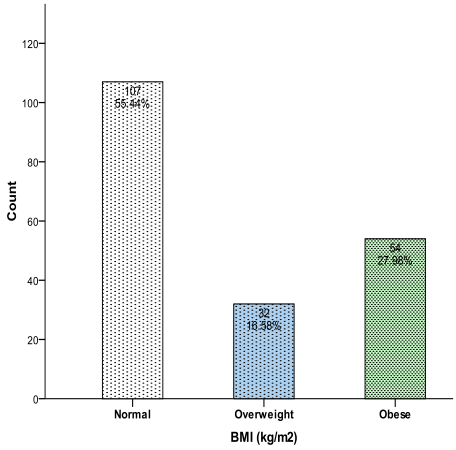

Figure 2. Body Mass Index of The Patients (n=193)

The frequency of recurrent preeclampsia in multiparous women was observed in 35.23% (68/193) cases as shown in figure 3 and raised BMI (≥25kg/m^2) in multiparous women with recurrent preeclampsia was in 50(73.5%) women. Recurrent Preeclampsia was significantly high in women with raised BMI (≥25kg/m^2) as presented in Table II.

Table II: Frequency of Raised BMI (≥25KG/M^2) In Multiparous Women with Recurrent Preeclampsia

BMI	Recurrent Preeclampsia		P-Value
	Yes (n=68)	No (n=125)	
≥ 25 kg/m^2 (Raised)	50(73.5%)	35(28%)	0.0005
< 25 kg/m^2	18(26.5%)	90(72%)	

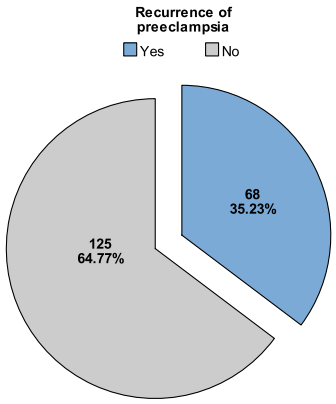

Figure 3. Frequency of recurrent preeclampsia in multiparous women (n=193)

Rate of recurrent preeclampsia was significant among different age groups (p=0.013) as shown in Table III.

Table III: Frequency of Recurrent Preeclampsia In Multiparous Women With Respect To Age Groups

Age Groups (Years)	Recurrent Preeclampsia		Total
	Yes(n=68)	No (n=125)	
16 to 20 Years	0(0%)	11(100%)	11
21 to 30 Years	43(42.2%)	59(57.8%)	102
31 to 40 Years	25(31.3%)	55(68.8%)	80

p=0.013

Similarly, Rate of recurrent preeclampsia was also significantly high in those women who had more than and equal to 4 parity (p=0.02) table IV. Rate of recurrent preeclampsia was also significant in those women whose time period from last parity to current

was long (p=0.0005) as presented in table V. Rate of recurrent preeclampsia was not significant with gestational age groups as shown in Table VI.

Table IV: Frequency of Recurrent Preeclampsia in Multiparous Women with Respect to Parity

Parity	Recurrent Preeclampsia		Total
	Yes (n=68)	No (n=125)	
2-3	44(30.6%)	100(69.4%)	144
4-5	24(49%)	25(51%)	49

p=0.020

Table V: Frequency of Recurrent Preeclampsia in Multiparous Women with Respect to Time Period from Last Parity to Current in Years

Time period from last parity to current in years	Recurrent Preeclampsia		Total
	Yes (n=68)	No (n=125)	
≤ 1 Years	16(16.8%)	79(83.2%)	95
2 to 3 Years	40(48.8%)	42(51.2%)	82
>4 Years	12(75%)	4(25%)	16

p=0.0005

Table VI: Frequency of Recurrent Preeclampsia in Multiparous Women with Respect to Gestational Age

GESTATIONAL AGE	Recurrent Preeclampsia		Total
	Yes (n=68)	No (n=125)	
≤25 Weeks	33(40.2%)	49(59.8%)	82
26 to 30 Weeks	16(33.3%)	32(66.7%)	48
>30 Weeks	19(30.2%)	44(69.8%)	63

p=0.43

Discussion

Pre-eclampsia, disease severity is mainly dependent on the adequacy of prenatal follow-ups and peripartum practices, which includes a methodology to control hypertensive crisis and prevention of eclamptic seizures.[10,11] Previously Adelusi and Ojengbede reported in their prospective study of 64 eclamptics from Ibadan, Nigeria as 16% recurrent eclampsia despite the antenatal care.[12] Chesley's reported a recurrence risk range variable from 0% to 21% from published series, with an around 5% risk for viable gestations.[13]Sibai et al, studied 223 females whose pregnancies were complicated by eclampsia with a mean follow up of 7.2 years.[14] In their study of 366 subsequent pregnancies, 22% were complicated by preeclampsia and 1.9% by eclampsia.[14] As far as nulliparous group was concerned, women who had eclampsia before 37 weeks of gestation had significantly higher incidences of preeclampsia and poor perinatal outcome in subsequent pregnancies, as compared with those who had eclampsia at or beyond 37 gestational weeks.

Advanced maternal age is one of the risk factors that are associated with pre-eclampsia.[15] The risk of pre-eclampsia in subsequent pregnancy increases with maternal age 1.3 per 5 years of age).[16] In our study, there were 102 of 193 (52.85%) women age between 20 to 30 years and 80 of 193 (41.45%) women were between 31 to 40 years. The average age of the women was 28.59±5.31.

Regarding parity of the women, in our study 74.61% women had 2 to 3 children and 25.39% had more than three children. Currently, it has been suggested that not only primiparous are at high risk but so on multiparous.[17]. Frequency of recurrent preeclampsia in multiparous women was observed in 35.23% (68/193) cases in our study which is comparable to the rate of 47-65% which was reported by Sibai, et al[18,] and it was 3-6 times more than the rate for nulliparous and higher than the rate of 18% reported by Michael, et al.[19]

Maternal weight and BMI are independent risk factors for preeclampsia, as well as other hypertensive disorders.[20-22] In our study Out of 193 women, 54 (27.98%) had obese and 32(16.58%) were overweight our results show that raised BMI (≥25kg/m^2) in multiparous women with recurrent preeclampsia was in 50(73.5%) women which is comparable to another study which stated that maternal overweight & obesity regarded as risk factors for pre-eclampsia.[23] In our study Recurrent Preeclampsia was significantly high in women with raised BMI (≥25kg/m^2). Body weight is strongly correlated with progressively increased preeclampsia risk, ranging from 4.3% for women with a body mass index (BMI) < 20 kg/m2 to 13.3% in those with a BMI >35 kg/m2. A United Kingdom study on obesity showed that 9% of extremely obese women were preeclamptic, compared with 2% of matched controls.[24] A systematic review of 13 cohort studies comprising nearly 1.4 million women found that the risk of preeclampsia doubled with each 5 to 7 kg/m^2 increase in pre-pregnancy BMI.[21] This relationship

persisted in studies that excluded women with chronic hypertension, diabetes mellitus, or multiple gestations, or after adjustment for other confounders. Cohort studies of women who underwent bariatric surgery suggest that weight loss significantly reduces the risk of preeclampsia.

Conclusion

We conclude that there is a high frequency of recurrent preeclampsia in multiparous women which may not only compromise a woman's health but may also affect her decision to have more children. According to our results, Pre-pregnancy BMI is also an important predictor of recurrent preeclampsia. Although this is also significant in those without a diagnosis of preeclampsia in their first pregnancies, the magnitude of risk is markedly higher in those with prior preeclampsia. However proper counseling and antenatal care is suggested in order to provide a good outcome in subsequent pregnancies.

DISCLOSURE: This article is based from the dissertation submitted to CPSP, Karachi.

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