

# Association Between Fetal Sex Ratio And Maternal Eclampsia - A Descriptive Study In Pakistani Population

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## Abstract

**Background** Different maternal conditions like diabetes, abruptio placentae and preterm labour and even eclampsia has been linked to fetal gender with conflicting results. **Objective** To study any association between maternal eclampsia and fetal sex ratio. **Setting**. Department of Obstetrics & Gynaecology, Sir Ganga Ram Hospital, Lahore. **Methods** The data was collected from hospital records of seven years from 2001-2007. Sex ratio was defined as number of males per 100 females. **Results** Results revealed male to female sex ratio 1.06 (95% CI 1.05-1.06) in non-eclamptic births and 1.77 (95% CI 1.120-2.086) in births complicated with eclampsia. Women with eclampsia had increased fetal male sex ratio (1.77). The proportion of male births (60.22 %) was statistically significant ( $p < .05$ ) from proportion of males in non-eclamptic births (51.49 %). The calculated p value by chi sq was 0.02. **Conclusion** We found meaningful association between male fetal gender and maternal eclampsia. Those pregnancies where the fetus is male in our region, may require appropriate monitoring and timely intervention to achieve an optimal outcome. Carrying a male fetus may be regarded as having a higher risk for development of eclampsia. Preventive measures can be taken early in pregnancy include offering ultrasound for detection of fetal sex, aspirin prophylaxis and Doppler studies.

## INTRODUCTION

Eclampsia is a recognized condition that is associated with high maternal and fetal morbidity and mortality, despite modern antihypertensive drugs. Fetal gender has been linked to different maternal conditions like diabetes, preterm labour and even abruption placentae<sup>1,2</sup>.

Although different studies have highlighted the association of gender of the fetus with eclampsia in the mother, the results are contradictory<sup>3,4</sup>. This may have resulted from different selection criteria for defining hypertensive disorders of pregnancy.

Eclampsia is the occurrence of generalized convulsions during pregnancy, labour or within 7 days of delivery not due to epilepsy or other convulsive disorders<sup>5</sup>. The incidence has been reported as 2/10,000 deliveries<sup>6</sup>. It has been called the disease of theories<sup>7</sup>. Seasonal variation of temperature and humidity are said to influence the hypertensive disorders of pregnancy<sup>8</sup>.

Basso reported that male to female sex ratio was 1.10 (95% CI-1.07-1.12) amongst births with eclampsia as compared to 1.04 (95% CI=1.02-1.05) in non eclamptic births.<sup>9</sup> Lopez

also confirmed the fact that antepartum eclampsia in singleton pregnancies occur more often in pregnancies with male fetuses.<sup>10</sup> Saqib reported that there is no significant association of fetal gender with eclampsia<sup>11</sup>.

The aim of our study was to investigate whether any relationship exists between occurrence of eclampsia and fetal gender. The findings may provide a new clue for understanding the association of fetal gender with maternal eclampsia.

## SUBJECTS AND METHODS

This study is based on the analysis of hospital records of seven years. The case records of labour rooms of Sir Ganga Ram Hospital, Lahore (Pakistan) from year 2001-2007 were reviewed. The cases were divided into two groups. Group 1 included women with eclamptic fits and group 2 comprised of non-eclamptics. Sex ratio was calculated and Chi square used to assess the significance of association. P value  $\leq 0.05$  was considered significant. CIs were also calculated.

## RESULTS

During a period of 7 years, 70264 maternities took place at

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the hospital. A total of 176 births were complicated by eclampsia.

The male to female sex ratio was 1.06 (95% CI = 1.05-1.06) amongst non eclamptic births and 1.77 (95% CI = 1.120-2.086) in births among mothers with eclampsia. Births with eclampsia were characterized by a increased fetal male sex ratio (1.77) as compared to non-eclamptic population (1.06). The difference in the proportion of males among two populations was statistically significant ( $P < 0.05$ ).

**Figure 1**

TABLE 1: SEX RATIO AND 95% CONFIDENTIAL INTERVAL FOR BOTH GROUPS

NON-ECLAMPTIC POPULATION						ECLAMPTIC POPULATION				
YEAR	TOTAL	MALES	FEMALES	SEX RATIO	95%CI	TOTAL	MALES	FEMALE	SEX RATIO	95%CI
2001	9182	4550	4632			21	16	5		
2002	9603	4740	4863			21	13	8		
2003	10083	4878	5205			45	24	21		
1004	8948	5259	3689	1.06	1.05-	20	12	8	1.77	1.120-
1005	10321	5447	4874		1.06	21	1	10		2.086
2006	10938	5269	5669			21	16	5		
2007	11189	6040	5149			27	14	13		
	70264	36183	34081			176	106	70		

**Figure 2**

TABLE 2: DISTRIBUTION OF GENDER OF BABIES BORN IN BOTH GROUPS

	Total	Males	Females.	Sex Ratio
Eclampsics	176	106(60.22%)	70(39.77)	1.77
Non eclampsics	70,264	36,183 (51.49 %)	34,081 (48.51 %)	1.06

**Figure 3**

TABLE 3: CALCULATION OF DEGREE OF SIGNIFICANCE FOR MALE FETUSES IN ECLAMPTIC MOTHERS

S/N	OBSERVED VALUE	EXPECTED VALUE	O-E	(O-E) <sup>2</sup>	P-VALUE	CHI-SQ	SIGNIFICANCE/NON SIGNIFICANCE
1	106	90.68	15.32	2.588	0.02	5.33	SIGNIFICANT
2	70	85.34	15.34	2.757			

## DISCUSSION

Eclampsia remains a serious obstetrical disorder. While analyzing 7 years' data, we encountered 176 (0.25%) cases of this disease. Reports of different regions show an incidence of 1.4-4% in hospital labors<sup>11-13</sup>.

Studies have performed to show whether fetal gender plays an important role in the development of eclampsia disease. However their results are contradictory<sup>3,4</sup>. Some have associated male gender with eclampsia while the others could not elicit any such relationship. This study was designed to investigate if any relationship exists between occurrence of eclampsia and fetal gender. Different studies have been attributed to biases in selection of cases, inconsistencies of diagnosis and mixture of parities. In order to avoid such bias this study focused only in women who had eclamptic fits. The results confirms the fact that eclampsia occur more often in pregnancies with male fetuses (Sex ratio 1.77 vs 1.06). It was noticed that women with eclampsia had male fetuses much more commoner than control population (Table-1). Antigenic disparity between the mother and fetus is likely to be heightened by a male fetus and predispose to an altered maternofetal interaction in the placental bed leading to pre-eclampsia a central pathogenic feature of the disorder<sup>14</sup>. It is of interest that shallow placentation and inadequate maternal blood supply seen in pre-eclampsia are also seen in miscarriage. This follows what Armgrinson postulated which is the male fetus predisposes to the development of preeclampsia and miscarriage of male fetus offers a protective mechanism to mother<sup>15</sup>. Contrary to that, Hsu et al observed a predominance of female fetuses in preterm pre-eclamptic pregnancies when compared with pre-term normotensive pregnancies<sup>16</sup>. Maksud has noticed increased incidence of pre-eclampsia and pregnancy induced hypertension in primiparous mothers with female fetuses<sup>4</sup>. Saqib failed to show any significant association of fetal gender with the occurrence of eclampsia in the mother<sup>11</sup>. The association of fetal gender would indicate a greater opportunity to find at risk women and tailor obstetrical care.

## CONCLUSION

This study reveals meaningful association between fetal gender and maternal eclampsia. Larger studies are thus required to study this relationship. If any such association exists an ultrasonography performed in early pregnancy for fetal anomalies may also be utilized for detecting fetal sex. If these mothers carry a male fetus, they can be regarded as high risk for development of eclampsia. Higher vigilance in the form of frequent antenatal visits and prescription of low dose aspirin could be instituted in these women. This strategy may reduce a higher perinatal and maternal loss associated with eclampsia.

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