

# Impact of Seasonal Variation on the Frequency of Eclampsia in Pregnant Women Having Gestational Amenorrhea More Than Twenty Weeks

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## ABSTRACT

**Objective:** To assess the impact of seasonal variation on the frequency of eclampsia in pregnant women having gestational amenorrhea more than 20 weeks.

**Study Design:** Cross sectional study

**Place and Duration of Study:** This study was conducted at the Obstetrics and Gynecology Department LUMHS Jamshoro from 28<sup>th</sup> October 2016 to 28<sup>th</sup> October 2017.

**Materials and Methods:** A total of 130 primigravida pregnant women, >20 weeks of gestational age were included in this study. Diagnosis of eclampsia was made by consultant obstetrician and the patient was managed by her under her direct supervision. Frequencies of eclampsia in pregnant women were noted in various seasons like summer, autumn, winter and spring.

**Results:** Women average age was 24.98±2.56 years. Frequency of eclampsia in the pregnant women having gestational amenorrhea was observed in 2.23% (130/5831) women. Incidence of eclampsia was 26.15% (34/5831) in spring season, 23.08% (38/5831) in summer season and 16.92% (22/5831) in autumn season, 33.8% (44/5831) in winter season but statistically there was no significant difference among different seasons (p=0.499). Similarly incidence of eclampsia was also not significant between monsoon and dry season (4% vs. 3.8%, p= 0.96).

**Conclusion:** The results of current study revealed no significant impact of seasonal changes on eclampsia. As eclampsia is very common in pregnant women, efforts should be taken to understand its aetiologies as possible prevention may reduce the patient burden and fetal/maternal morbidity/mortality.

**Key Words:** Eclampsia, gestational amenorrhea, seasonal variation, winter, summer

**Citation of article:** Ramzan R, Sultana A, Yousfani S, Shaikh NB, Mohsin N, Chohan MN. Impact of Seasonal Variation on the Frequency of Eclampsia in Pregnant Women Having Gestational Amenorrhea More Than Twenty Weeks. Med Forum 2021;32(10):7-10.

## INTRODUCTION

Eclampsia is a complication of severe preeclampsia, it is defined as new onset seizures/coma and clinical features of preeclampsia during pregnancy or postpartum period. It occurs after the 20th week of gestation or in the postpartum period<sup>1</sup>. About 80% of eclamptic seizures occur during intrapartum period or within the first 48 hours of delivery.

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Received: May, 2021

Accepted: July, 2021

Printed: October, 2021

Rarely it may occur before 20 weeks' of gestation. Some times eclampsia may occur without hypertension<sup>2</sup>. The incidence of hypertension in pregnancy is about 10% and half of the cases are due to Eclampsia and preeclampsia<sup>3</sup>.

Eclampsia can increase the maternal morbidity/mortality and it is associated with neonatal problems like prematurity, perinatal death, placental abruption and intrauterine growth restriction<sup>4</sup>. Worldwide the incidence of preeclampsia/eclampsia is 2-8%.<sup>5</sup> In Pakistan 34% of maternal death occur due to eclampsia<sup>6</sup>.

Previous studies from tropical areas shows increased incidence of eclampsia in winter and monsoon season comparing the summer and dry season.<sup>7</sup> According to various literature evidence, there is protective effect of dehydration on seizures that's why in summer season seizures are less evident while overhydration and hyponatraemia are associated with seizures. In winter season vasospasm and release of vasoactive substances can be a proposed mechanism for hypertension<sup>8</sup>. Plasma volume change in various seasons can be a risk factor for preeclampsia<sup>9</sup>.

A local study from Peshawar showed that the Frequency of eclampsia in pregnant women was more common during winter season (34.25%) and least common during autumn (17.59%)<sup>17</sup>. This study was conducted at a region of Sindh Province, which has total different climate and contains all 5 seasons like winter, summer, autumn, spring and Moon Soon Season. This region have specific seasons that is in winter season there is no severe coldness and in summer season temperature is between 40 and 42 degree Celsius, that is totally different from the rest of other regions in Pakistan. . This study will make a base to compare the effects of various seasons in Pakistan on eclampsia in pregnant women. Our hospital is a tertiary care teaching hospital, we deal lot of eclamptic women throughout the year, so we planned this study to assess the impact of season on eclampsia in pregnant women having gestational amenorrhea more than 20 weeks.

## MATERIALS AND METHODS

Eclampsia is defined as Systolic Blood pressure >140 or Diastolic Blood Pressure >90 mmHg on two separate occasions with 24 hours urinary proteinuria >300 mg along with seizures in Pregnant women. Sindh is in the temperate zone (between tropics and Polar Regions) having dry climate. Winter: Cool and dry season (December to February). Spring: Hot and dry season (March to May). Summer: Hot season (June to September), humidity season (July/August) Autumn: Cooler humid season (October to November).

This cross sectional study was done Obstetrics and Gynecology Department, with Non Probability consecutive sampling from 28th October 2016 to 28<sup>th</sup> October 2017 (total 1 year duration). Sample size is calculated by taking prevalence (p) of eclampsia 19% (1), margin of error 5%, confidence interval 95%. The sample size comes out to be at least n=130 patients of eclampsia. It included all pregnant women having gestational age more than 20 weeks. All Booked or unbooked patients of age 18 to 30 years and primigravida after 20 weeks of gestation was included in this study. Patients having history of eclampsia in previous pregnancies, eclampsia in other family members, fits, diabetes, hypertension, renal disorders, drug addiction, Multi-fetal pregnancy or smoking during pregnancy were excluded from the study.

Permission of ethical review committee was taken. Informed consent was taken from the attendant of the patient who fulfilled the selection criteria. A predesigned Performa was used for documenting, socio-demographics, personal history, medical history, obstetrical history, environmental temperature, humidity level and season of presentation. Physical examination and other routine investigations were performed according to standard protocol. Diagnosis of eclampsia was made by consultant obstetrician and the

patient was managed by her or under her direct supervision.

Statistical analysis was performed by using statistical packages for social science version 22). Means with standard deviations were calculated for quantitative variables like maternal age, weight, Body Mass Index (BMI), gestational age, parity, Systolic and diastolic blood Pressure and Hemoglobin, environmental temperature, humidity level. Frequencies with proportions were calculated for qualitative variables like number of eclamtics (Seasonal variation), anemia, education, economic status. Chi square test was applied to obtain P-value. Level of significance was up to 0.05. Stratification was done for age, education, economic and BMI to determine their effect on outcome eclampsia and seasonal variation (spring, autumn, summer, winter). Post stratification chi-square test was applied.

## RESULTS

**Table No.1: Various characteristics of women (N=130)**

Characteristics	n	%
Age Distribution Of The Women		
<= 20 years	7	5.38
21 – 25 years	75	57.69
26 – 30 years	48	36.92
Education Status Of The Women		
Illiterate	10	7.69
Below Matric	34	26.15
Matric	45	34.62
Intermediate	30	23.08
Graduate / Post graduate	11	8.46
Economic Status Of The Women		
> 25,000	36	27.69
10,000 – 25,000	94	72.31
Frequency of Eclampsia with Seasonal Variation in the Pregnant Women Having Gestational Amenorrhea		
Autumn	22	16.69
Spring	34	26.15
Summer	30	23.08
Winter	44	33.85

**Table No.2: Descriptive Statistics of Characteristics of Study Patients**

Variables	Mean	SD
Age (Years)	24.98	2.56
Weight (kg)	72.68	10.43
Height (cm)	157.26	5.89
BMI (kg/m <sup>2</sup> )	29.42	4.15
Gestational Age (weeks)	29.86	4.66
SBP (mmHg)	127.00	8.41
DBP (mmHg)	78.13	5.20
SBP 2 <sup>nd</sup> time (mmHg)	125.9	7.10

DBP 2 <sup>nd</sup> time (mmHg)	82.92	7.14
Heart Beat (beat/min)	12.28	1.30
Environment Temperature	24.09	8.43
Humidity	79.49	12.19

A total of 5831 deliveries were recorded during the study period, of which 130 patients developed eclampsia (2.23%). Most of the pregnant women were between 21 to 25 years of age as shown in table 1. The average age of the women was 24.98±2.56 years. Other characteristics of the women and average environmental temperature and humidity are also presented in table 1. Education status of the patients was also observed and shown in bar table 1. Family

income status of 94(72.31%) women were 10, 000 to 25,000 in rupees and 36(27.69%) were above Rs. 25,000 as shown in table 1.

Frequency of eclampsia with seasonal variation in the pregnant women having gestational amenorrhea is shown in table 1. Eclampsia was 23.08% in summer season, 26.15% in spring, 16.92% autumn and 33.85% in winter season. Stratification analyses were also performed and observe that rate of eclampsia with seasonal variation was not significant with respect to different age groups ( $p=0.18$ ) as shown in tale 1. It was also not significant with respect to education status of the patients, economic status and BMI of the patients as shown in table 2 and 3.

**Table No.3: Frequency of eclampsia with seasonal variation in the pregnant women having gestational amenorrhea**

Eclampsia with seasonal variation	Winter	Spring	Summer	Autumn	P-Value	Chi-Square	df
<b>AGE DISTRIBUTION OF THE WOMEN</b>							
<= 20 years	2 (71.4%)	0(0%)	0(0%)	2(28.6%)	0.18	8.806	6
21 – 25 years	22(29.3%)	2(26.7%)	21(16%)	12(16%)			
26 – 30 years	17(35.4%)	14(29.2%)	9(18.8%)	8(16.7%)			
<b>EDUCATION STATUS OF THE WOMEN</b>							
Illiterate	5(50%)	2(20%)	1(10%)	2(20%)	0.28	0.28	8
Below Matric	11(32.4%)	7(20.6%)	10(29.4%)	5(17.6%)			
Matric	20(44.4%)	11(24.4%)	9(20%)	5(11.1%)			
Intermediate	8(26.7%)	11(36.7%)	6(20%)	5(16.7%)			
Graduate and Above	0(0%)	3(27.3%)	4(36.4%)	4(36.4%)			
<b>ECONOMIC STATUS</b>							
≤ 25,000 Rs.	31(33%)	25(26.6%)	22(23.4%)	16(17%)	0.99		
> 25,000 Rs	13(36.1%)	9(25%)	8(22.2%)	6(16.7%)			
<b>BMI</b>							
≤ 25	10(43.5%)	3(13%)	3(13%)	7(30.4%)	0.125	9.98	
25.1 to 30	17(28.8%)	21(35.6%)	13(22%)	8(13.6%)			
>30	17(35.4%)	10(20.8%)	14(29.2%)	7(14.6%)			

## DISCUSSION

In our study frequency of eclampsia with seasonal variation in the pregnant women having gestational amenorrhea was 33.85% in summer season, 26.15% in spring, 23.85% autumn and 16.15% in winter season. The difference between various seasons is not statistically significant. However, it should be considered that this study was performed in a region where temperate meteorological condition were present and various climatic conditions were lacking. It may be due to lack of significant difference in respect of temperature or humidity among seasons in this area. For example, spring and summer are slightly similar, and autumn and winter are slightly similar. In a study by Janani F, et al results were different from our study showing preeclampsia was highest among women with deliveries in summer while it was lowest among women with deliveries in winter ( $P < 0.001$ ).<sup>10</sup> Bibi H, et al conducted a study at Abottabad, they found 132 (1.04%) incidence of eclampsia. The results were

different from our study, in winter and spring season (November to April) there were 80 (1.33%) cases and in summer and autumn season (May to September) 52(0.79%) cases ( $p$  value 0.0474)<sup>11</sup>. The difference in result may be due to extreme of cold in Abottabad as compared to our study area (Hyderabad). Soroori ZZ, et al from Iran found similar results like us, they revealed in their study that incidence of eclampsia was 3.3%. It was more in spring (3.6%), and lower in summer season (3%), but the results were not statistically significant<sup>12</sup>. In a local study Halimi S, et al found 108 (0.46%) cases of eclampsia during study period. There were more cases in winter (34.25%), 17.59% in autumn, 21.29% in summers and 26.85% in spring<sup>13</sup>. Nanbakhsh F, et al found in their study that month and season of conception had no significant correlation with preeclampsia. Although it increased from April to August and then it decreased until March but the results were not statically significant ( $p=0.243$ ). In another study, conception in the summer had more eclampsia as compared to conception in autumn and winter season

with statically significant results ( $p < 0.04$ ). Conceptions in warm seasons (spring and summer) had more eclampsia comparing the conception in cold seasons (autumn and winter) ( $p = 0.038$ )<sup>14</sup>.

In a study by Shahgheibi S, et al mean age of eclamptic women was  $30.5 \pm 6.60$  years. In winter season preeclampsia was present in 30% women. Relation between the season of conception and the month of preeclampsia was not significant ( $P = 0.67$ )<sup>15</sup>. In a study from Rwanda overall prevalence of eclampsia was 0.3%. Two thirds of patients presenting with PEC/EC were admitted during the rainy season (OR 1.36,  $p = 0.002$ ). Season at conception did not affect the prevalence of PEC/EC at admission. There was no difference in the severity of the disease based on seasonality<sup>16</sup>.

Our results were not similar to a local study from Peshawar that showed that most common season for eclampsia in pregnant women was winter (34.25%), this difference may be due to more poor socioeconomic status and multigravida women in their study<sup>17</sup>.

## CONCLUSION

The results of current study revealed no significant impact of seasonal changes on eclampsia. As eclampsia is very common in pregnant women, efforts should be taken to understand its aetiologies as possible prevention may reduce the patient burden and fetal/maternal morbidity/mortality.

### Author's Contribution:

Concept & Design of Study:	Romana Ramzan
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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