ORIGINAL ARTICLE

Seasonal Variation in the Occurrence of Eclampsia

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ABSTRACT

Aim: To estimate the seasonal pattern in the occurrence of eclampsia in the cohort of the patients presenting to the tertiary level hospital.
Methods: This study included 20,132 births that had occurred in Obstetrics & Gynaecology Units of Lady Reading Hospital, Peshawar from 2005 till 2008. All deliveries after 28 weeks of gestation are recorded in the labour ward. Eclampsia was diagnosed as having fits in a patient with pre-eclampsia and proteinuria already diagnosed in the pregnancy. Past history of fits due to other causes was excluded. Parity was categorized as 0, 1, 2 or 3, and 4 or more.
Results: There were a total of 20,132 births, 810(4.02%) cases of eclampsia were recorded. The frequency of eclampsia was found to be highest (4.925) in December. The frequency declined during spring and summer to the lowest level (3.29%) in August and increased gradually in the autumn months except for the month of February. The ratio for eclampsia was 1.49 for December, with August as reference month. A substantial increase in risk was found for women between 21 and 25 years of age (53.40%). Most of the cases of eclampsia occurred between 32 and 35 completed weeks of gestation (OR 406.38).
Conclusion: The study has identified a pattern in the frequency of eclampsia which is more in the winter season. The exact mechanism by which climacteric factors affect the pathophysiology of eclampsia is beyond the scope of this study.
Key words: Variation, Occurrence, Eclampsia

INTRODUCTION

Eclampsia is defined as the occurrence of convulsions not caused by coincidental neurologic disease e.g. epilepsy in a woman whose condition also meets the criteria for pre-eclampsia.[1,2] Eclampsia is a problem in the underdeveloped countries. It is relatively uncommon in developed countries. It accounts for approximately 50,000 maternal deaths worldwide each year.[3-5] In addition it is associated with a five-fold increase in perinatal mortality. The etiology of pre-eclampsia and eclampsia is not fully understood. With the exception of smoking[6], the literature has not been systematically reviewed for factors that predict the relative risk of developing eclampsia and pre-eclampsia. The factors that have been studied as being possibly related to pre-eclampsia and eclampsia are maternal age, parity, genetic factors, history of pre-eclampsia, diabetes, body mass index, race, regional variation and nutritional status.[7-11] Previous studies have shown a variable association of pre-eclampsia and eclampsia with the changing weather patterns of different seasons. Studies coming from different parts of the world frequently give opposing results. Majority of the published studies conclude that pre-eclampsia and eclampsia occur more frequently in winter[1213,14,15].

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PATIENTS AND METHODS

All deliveries after 28 weeks of gestation are recorded in the labour ward data (manually and hospital data base) in the Obstetrics & Gynaecology Units of Lady Reading Hospital, Peshawar. We analyzed all 20,132 births that had occurred in Gynaecology A unit from 2005 till 2008. Information on all variables was obtained from labour ward registers. Eclampsia was diagnosed as having fits in a patient with pre-eclampsia and proteinuria already diagnosed in the pregnancy. Past history of fits due to other causes was excluded. Parity was categorized as 0, 1, 2 or 3, and 4 or more. Maternal age at delivery was analyzed in six groups: ≤20, 21-25, 26-30, 31-35, 36-40 and ≥41 years of age. Gestational age was estimated based on the first day of last menstrual period or from the first and early second trimester scans. The data was analyzed in SPSS-15. The frequency of eclampsia each month was estimated as number of births for which eclampsia has been noted divided by all births during the months. The ratio was defined as frequency in any month divided by the frequency in the reference month. The relative risk of eclampsia in any month was expressed as odds ratio. Maternal ages, parity, gestational age, time period were also expressed as odds ratio, in addition to frequency.

RESULTS

There were a total of 20,132 births from 2005-2008 in Gynaecology A Unit of Lady Reading Hospital Peshawar. Among all, 810 (4.02%) cases of eclampsia were recorded. The frequency of eclampsia was found to be highest (4.925) in December. The frequency declined during spring and summer to the lowest level (3.29%) in August and increased gradually in the autumn months except for February (Table 1). The ratio for eclampsia was 1.49 for December, with August as the reference month. Adjusted odd ratios for eclampsia according to the month of birth did not alter the seasonal trends (Table 2). The risk of eclampsia was highest in the women in their first pregnancy (50.49%). The risk in second pregnancy was 37% of the risk of first pregnancy and it fell with increasing parity. A substantial increase in risk was found for women between 21 and 25 years of age (53.40%). Most of the cases of eclampsia occurred between 32 and 35 completed weeks of gestation (OR 406.38). Analyzing the data for 4 years, the frequency of eclampsia was highest in 2004 (27.53%) [Table 3].

Table 1: Frequency ratio of eclampsia with August as reference month

Month	Frequency	Ratio
January	4.49	1.36
February	3.08	0.93
March	4.11	1.25
April	3.72	1.13
May	4.59	1.40
June	3.78	1.15
July	3.42	1.04
August	3.29	1.00
September	3.44	1.05
October	4.86	1.48
November	4.69	1.43
December	4.92	1.49

Table 2: Adjusted odds ratios (OR) for eclampsia according to month of birth

Month	Frequency	Ratio
January	4.49	1.00
February	3.08	0.68
March	4.11	0.92
April	3.72	0.83
May	4.59	1.02
June	3.78	0.84
July	3.42	0.76
August	3.29	0.73
September	3.44	0.77
October	4.86	1.08
November	4.69	1.04
December	4.92	1.09

Table 3: Effect modifiers of eclampsia

Parity	Frequency	Adjusted OR
0	50.49	1.00
1	18.77	0.37
2-3	14.32	0.28
4+	16.42	0.33
Maternal Age		
< 20	12.35	1.00
21-25	53.70	4.35
26-30	19.63	1.59
31-35	6.30	0.51
36-40	5.43	0.44
41	2.59	0.21
Gestational Age (weeks)		
< 27	0.12	1.03
28-31	4.20	34.98
32-35	48.77	406.38
36+	46.91	390.95
Time Period		
2005	21.98	1.00
2006	25.56	1.16
2007	27.53	1.25
2008	24.94	1.13

DISCUSSION

Available literature on seasonal variation in the incidence of pre-eclampsia and eclampsia is much divided in its conclusion.[13-16] Pre-eclampsia and eclampsia are major obstetric complications with unclear etiologies. Understanding the exact association with different weather patterns way help us in understanding what factors may be involved in triggering these event.

We found a systematic seasonal variability in the occurrence of eclampsia with a peak in winter months and minimum in summers. Various hypothesis of the causes of pre-eclampsia and eclampsia have been put forward. Seasonal trend reports from other countries[9,12,15,17,18] and our observations point to environmental factors that show seasonal variability in occurrence. Cold weather could lead to vasospasm that is a part of the pathogenesis of eclampsia[12]. Pre-eclampsia and eclampsia can be thought of as having both pre-disposing (the fetomaternal genes), contributing (infections, diet) and precipitating causes (cold weather)[12].

An interesting study in Norway concluded that there was a relationship between pre-eclampsia and seasons with a higher incidence during colder seasons[12]. The data in that study spanned a twenty-one year period. The study emphasized the possible role of environmental factors like the diet during seasons.

Another Scandinavian study from Sweden revealed that the prevalence of pre-eclampsia and eclampsia was reduced during the summer

compared to winter months[15]. Other studies from India and Ghana reported that more cases of eclampsia were seen during the rainy season[9,10]. It is interesting that while studies in sub-saharan Africa[1,19,20] showed a seasonal variation in the occurrence of eclampsia, studies in the United States concluded that the incidence of eclampsia was not influenced by climacteric factors even in periods of high humidity[16].

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