

The Incidence of Preeclampsia and Eclampsia in Obstetric-Gynecologic “Queen Geraldine” in Tirana, Albania during 2000-2013

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Abstract: ***Objective:** To evaluate the incidence of preeclampsia and eclampsia and associated mortality in a tertiary referral center between 2000 and 2013. **Materials and methods:** This retrospective study was carried out in the Obstetric-Gynecologic “Queen Geraldine” in Tirana, Albania a tertiary level center for the country. The incidence, demographics of women with pre-eclampsia and eclampsia and neonatal outcomes of all singleton births in this hospital were recorded. Diagnoses of preeclampsia and eclampsia were established according to the ICD. **Results:** The incidence of preeclampsia was 2.7% (95%CI 2.65-2.80), presenting a significant downward trend over the study period, 4% in 2000 and 1.7% in 2013 ($p<0.01$). The rate of eclampsia was 8.6/ 10,000 births or 2.6% of preeclampsia cases, decreasing from 1.9% to 1.5% ($p=0.2$). RR of eclampsia in 2013 was 0.7 (95% CI 0.23 -2.51) compared with the year 2000 ($p=0.6$). Eighty percent of seizures occurred in nuliparous women ($p<0.01$). No seasonal variation of seizure occurrence was found ($p=0.6$). **Conclusion:** The incidence of preeclampsia has decreased significantly as well as the rate of eclampsia, however not significantly. Modern obstetric care and the introduction into national programmes and health-care services of evidence-based policies it is essential to the prevention and management of pre-eclampsia and eclampsia to reduce the infant morbidity and mortality.*

Keywords: eclampsia, hypertension, incidence, preeclampsia

1. Introduction

Hypertensive disorders of pregnancy represent a group of conditions associated with high blood pressure during pregnancy, proteinuria and in some cases convulsions. The most serious consequences for the mother and the baby result from pre-eclampsia and eclampsia. Eclampsia is usually a consequence of pre-eclampsia consisting of central nervous system seizures which often leave the patient unconscious and if untreated it may lead to death.

Complicating 2–8% of pregnancies, pre-eclampsia, along with the other hypertensive disorders of pregnancy, is a major contributor to maternal mortality worldwide (1,2). The syndrome of pre-eclampsia is associated with high risks of preterm delivery, intrauterine growth restriction, placental abruption, and perinatal mortality. The incidence of condition is 1.5-fold to 2-fold higher in first pregnancies (3). Several studies conducted in developed countries have reported rates of 2-3 cases per 10,000 births while developing countries have reported higher rates 16-69 per 10,000 births (4).

About 12% of maternal deaths worldwide are attributed to eclampsia with a case fatality rate of 3-5% in developing countries (5,6). Population rates of pregnancy hypertension based on routinely collected data vary substantially in high income countries, ranging from 4% to 10%, including pre-eclampsia rates of 2% to 5% (7-12). With regular antenatal care and detection of preeclampsia early, eclampsia can be prevented in large. Clinician’s knowledge of the incidence of the disease within their area of practice it is essential for the effective detection and treatment of preeclampsia and eclampsia within any country or health region (13).

Regarding the seasonal variation studies coming from different parts of the world frequently give opposing results (4). The aim of this study was to determine the incidence of

preeclampsia and eclampsia in a tertiary hospital which encompasses almost half of the births in the country, the variations over time periods and maternal mortality due to diagnosis.

2. Materials and Methods

This retrospective study was carried out on pregnant women with more than 20 weeks of gestation with pre-eclampsia and eclampsia who were admitted in the Obstetric-Gynaecologic “Queen Geraldine” hospital which is a tertiary care referral center in Tirana, Albania. Birth data including maternal age, parity, delivery type, and neonatal outcomes for the period 2000-2013, of all singleton births in this hospital were recorded. Diagnoses of preeclampsia and eclampsia were established according to the ICD. This hospital accounts for almost half of the births in the country

3. Statistical Analysis

Incidence was calculated and demographic data were explored. Analyses of variance (ANOVA) were used to examine differences between the categories of pregnancy. Contingency tables and chi square test for trend was used. Univariate and multivariate logistic regression model was employed. Significance was set at <0.05 level. Analyses were conducted using SPSS 16.0

4. Results

The overall preeclampsia rate is 2.7% (95%CI 2.65-2.80) of singleton births, 5167 cases from 188991 births. The incidence of preeclampsia in this setting presented a significant downward trend over the study period, 4% in 2000 and 1.7% in 2013 ($p<0.01$). The incidence of preeclampsia is expressed as a percent of all births whilst eclampsia is expressed as a percent of all preeclampsia cases (fig. 1).

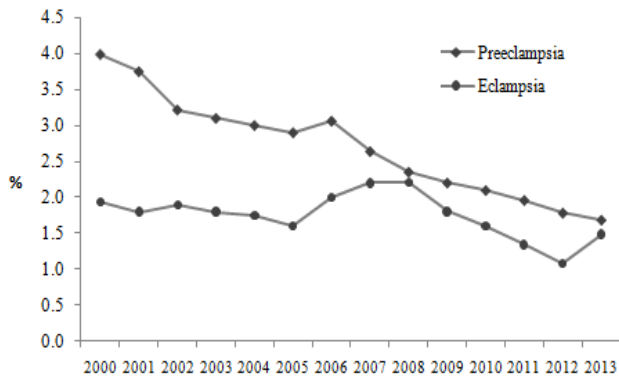


Figure 1: The incidence of preeclampsia and eclampsia

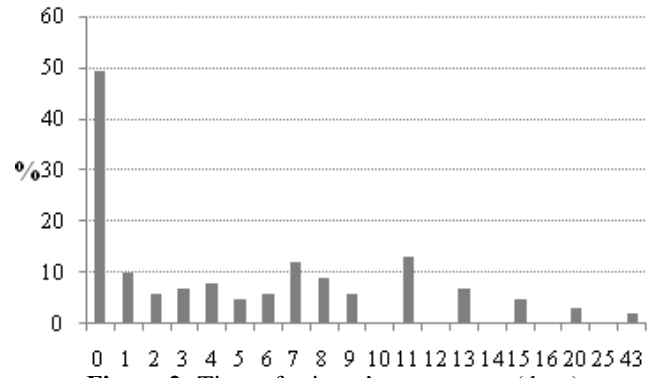


Figure 2: Time of seizure's occurrence (days)

Overall there were 126 episodes of seizure in 111 pregnancies. Seizures occurred in one, two, and three pregnancies. Four women experienced more than one episode of seizure in one pregnancy, two women in 2 pregnancies and one woman in three pregnancies.

The overall rate of seizure occurrence was 6.7/10,000 births. A remarkable though non significant decrease in the incidence of eclampsia was noted, representing 0.08% of all births in 2000 and 0.03% in 2013 (p=0.06).

Overall 2.5% of births among women affected by preeclampsia ended up at eclampsia which showed a decrease from 1.9% in the year 2000 to 1.5% in 2013 (p=0.2). Compared with the year 2000 the relative risk of eclampsia in women with preeclampsia in 2013 was 0.7 (95% CI 0.23 -2.51), (p=0.6). Eighty percent of seizures occurred in nuliparous women (p<0.01). Regarding the relationship of parity and seizure occurrence nuliparous women were more likely to experience a seizure when compared with a multiparous women, OR= 3.9 (95% CI, 2.91-6.14) in a multivariate logistic regression model adjusted for age. The estimated the risk of seizure in 2013 compared with 2000 for all women adjusted for maternal age, gestational age at birth and parity did not show a significant increase in risk over the period of the study. Regarding the time when the event occurred, the majority of seizures occurred in the intrapartum period (39.4%) (table 1).

Table 1: Occurrence of seizure

Time of occurrence	%
Antepartum	28.2
Intrapartum	39.4
Postpartum	24.3
Not specified	8.1

The univariate RR of a seizure occurring postpartum was higher among women following a birth via caesarean section, 2.4 (95% CI 1.98-3.26) compared with a vaginal birth. Regarding the time from birth to seizure the majority of women experienced eclampsia on the day of birth (49.4%). The median time for eclampsia was zero days or the day of birth, with a range 0 to 43 days. For the cases that occurred following the day of birth, the median day of postnatal seizure occurrence was day 4 (range, 1- 43).

Maternal characteristics and neonatal outcomes were examined and described (table 2). There is no statistically significant difference with regard to age between women in three groups. The majority of women with eclampsia are nuliparous, delivered at earlier gestational age. Also, the neonatal mortality was higher among infants of women with eclampsia.

Table 2: Maternal characteristics and neonatal outcome

Variable	Eclampsia n=111	Preeclampsia n=5056	Normotensive n=183824	p
Age (mean, SD)	29 (5.3)	29.5 (4.8)	30.4 (4.2)	0.1
Parity (n,%)				
0	74.1	47.4	39.4	
1-2	18.2	36.7	35.3	
≥3	7.7	15.0	25.3	<0.01
Gestational age (n,%)	33.7 (2.6)	34.8 (2.8)	39.0 (2.1)	<0.01
Vaginal birth (n,%)	51.2	44.3	76.5	<0.01
Neonatal mortality rate	27.4/1000	14.2/1000	9.7/1000	<0.01

Thirty five maternal deaths that occurred within the 12-month period following delivery from whom 8 (23%) had experienced preeclampsia. The RR for women with preeclampsia/eclampsia dying in the first 12 months following birth is 8.8 (95%CI 3.88-20.35) when compared with normotensive women. The neonatal mortality rate for infants of women with eclampsia was 22.3/1000 and 10.7/1000 for infants of women with preeclampsia compared with 7.9/1000 for the normotensive women. The association of eclampsia to seasons was explored comparing the number of births that occurred from June to August and from September to May. There was no statistical difference in the incidence of eclampsia based on season of seizure occurrence (p=0.6).

5. Discussion

This study reports a mean preeclampsia rate of 2.7% of all singleton pregnancies over an 14-year period and eclampsia in this setting has an incidence of 6.7/10,000 births. These figures are similar to the world pooled estimate of 3.4% and comparable with that seen in northern European countries (6,14). There is a number of factors influencing the difference in rates of preeclampsia between developed and developing countries and between developing countries such as variation in the quality and accessibility of care and the variations in reporting methods and standards. The design and the definitions used also varied among different studies. The issue around consensus of diagnostic features is also

contentious when defining preeclampsia. Assessing the incidence of pre-eclampsia and eclampsia is difficult due to lack of conformity of the definitions. There may also be measurement bias and errors in the ascertainment of both hypertension and proteinuria. Because uniform diagnostic criteria are not always followed by those who study and report on hypertensive disorders of pregnancy, reported incidence may not be readily comparable between sites (6). The declining rate of preeclampsia over the study period (4.0% to 1.7% of all births) is of great interest. Potential reasons for this could be an improvement in the early identification of cases over time with the initiation of medication at earlier gestations to maintain blood pressure control at acceptable limits or the shift away from blood pressure management from the inpatient to the outpatient setting with a subsequent decrease in the likelihood of a preeclampsia diagnosis being recorded on the birth admission. Earlier treatments could also have resulted in more women receiving a diagnosis of gestational hypertension rather than preeclampsia (15). It could also be postulated that increasing rates of induced labors and elective caesarean sections, and associated birth at earlier mean gestations, are resulting in a fall in preeclampsia cases because of a reduction in the period required for women to develop and display disease manifestations, practices that effectively reduce the occurrence of cases that would have presented in postdate pregnancies (16).

The 1.5% eclampsia rate expressed as a percentage of preeclampsia cases at the end of the study period was lower than that reported in the greater majority of developed countries with the relative risk for women with preeclampsia suffering an eclamptic seizure almost doubling between the years 2000 to 2008. In our study, the overall eclampsia rate over the 14-year period was 6.7/10,000 births with slight changes between 2000 and 2013. This finding are in line with falling eclampsia rates reported in both Canada (12.4 to 5.9/10,000 births between 2003 and 2009)¹⁷ and the United States (6.34 to 4.80/10,000 delivery hospitalizations between 1998 and 2008). This study did report an increase in postpartum eclampsia from 1.76 to 2.8 cases/10,000 delivery hospitalization during the same period. These results would also support the argument that the incidence of preeclampsia and eclampsia are not positively correlated and that identification of impending eclampsia and treatment variations differ significantly between obstetric units and countries (17,18). Diabetes, chronic hypertension and multiple pregnancy are associated with a two- to threefold increase in risk of pre-eclampsia, but occur infrequently. Small changes in the prevalence of these factors are unlikely to have a large impact on pregnancy hypertension rates in the population. While advanced maternal age and obesity are more common, the magnitude of risk is lower, less than double. Although only a few countries could provide information on obesity in pregnant women, we assume that this is increasing in all participating countries, based on population trends (19,20). Declining rates of pregnancy hypertension and pre-eclampsia in northern Europe, a reassuring finding in the context of increasing maternal age, nulliparity and obesity (16,21,22). Almost 90% of pregnancy hypertension and over 70% of pre-eclampsia events occur at term, but fewer pregnancies are reaching 40 weeks or beyond. Increasing rates of planned delivery of women with

gestational hypertension could also explain why more study areas had decreases in pre-eclampsia rates (15,23,24). Unlike other studies findings (25) in our study there was no seasonal variation of eclampsia.

6. Conclusion

Preeclampsia is a serious complication of pregnancy. Modern obstetric care and the introduction into national programmes and health-care services of evidence-based policies it is essential to the prevention and management of pre-eclampsia and eclampsia to reduce the infant morbidity and mortality.

References

- [1] Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PFA. WHO analysis of causes of maternal death: a systematic review. *Lancet* 2006; 367: 1066-74.
- [2] Duley L. The global impact of pre-eclampsia and eclampsia. *Semin Perinatol* 2009; 33: 130-37.
- [3] Cande V Ananth, Katherine M Keyes, Ronald J Wapner, Pre-eclampsia rates in the United States, 1980-2010: age-period-cohort analysis *BMJ* 2013; 347 doi: <http://dx.doi.org/10.1136/bmj.f6564> (Published 7 November 2013)
- [4] Subramaniam V. Seasonal variation in the incidence of preeclampsia and eclampsia in tropical climatic conditions. *BMC Women's Health* 2007;7:18.
- [5] World Health Organisation. The World Health Report 2005: Make every mother and child count. Geneva: World Health Organization; 2005.
- [6] Dolea C, Abou Zahr C. Global burden of hypertensive disorders of pregnancy in the year 2000. Geneva:World Health Organisation; 2003.
- [7] Roberts CL, Algert CS, Morris JM, et al. Hypertensive disorders in pregnancy: a population-based study. *Med J Aust* 2005;182:332e5.
- [8] Hernandez-Diaz S, Toh S, Cnattingius S. Risk of pre-eclampsia in first and subsequent pregnancies: prospective cohort study. *BMJ* 2009;338:b2255.
- [9] Klemmensen AK, Olsen SF, Osterdal ML, et al. Validity of pre-eclampsia-related diagnoses recorded in a national hospital registry and in a postpartum interview of the women. *Am J Epidemiol* 2007;166:117e24
- [10] Wallis AB, Saftlas AF, Hsia J, et al. Secular trends in the rates of pre-eclampsia, eclampsia, and gestational hypertension, United States, 1987e2004. *Am J Hypertens* 2008;21:521e6.
- [11] Lawler J, Osman M, Shelton JA, et al. Population-based analysis of hypertensive disorders in pregnancy. *Hypertens Pregnancy* 2007;26:67e76.
- [12] Walker RL, Hemmelgarn B, Quan H. Incidence of gestational hypertension in the Calgary Health Region from 1995 to 2004. *Can J Cardiol* 2009;25:e284e7
- [13] Thornton C, Dahlen H, Korda A, et al. The incidence of preeclampsia and eclampsia and associated maternal mortality in Australia from population-linked datasets: 2000-2008. *Am J Obstet Gynecol* 2013;208:476.e1-5.
- [14] Klungsoyr K, Morken NH, Irgens L, Vollset SE, Skjaerven R. Secular trends in the epidemiology of

- pre-eclampsia throughout 40 years in Norway: prevalence, risk factors and perinatal survival. *Paed Perinat Epi* 2012;26: 190-8.
- [15] Mealing NM, Roberts CL, Ford JB, Simpson JM, Morris JM. Trends in induction of labour, 1998-2007: a population-based study. *ANZ J Obstet Gynaecol* 2009;49:599-605.
- [16] Roberts CL, Ford JB, Algert CS, et al. Population-based trends in pregnancy hypertension and pre-eclampsia: an international comparative study. *BMJ Open* 2011;1: e000101. doi:10.1136/ bmjopen-2011-000101
- [17] Liu S, Joseph KS, Liston RM. Incidence, risk factors, and associated complications of eclampsia. *Obstet Gynecol* 2011;118:987-94.
- [18] Callaghan William M, Creanga Andreea A, Kuklina Elena V. Severe maternal morbidity among delivery and postpartum hospitalizations in the United States. *Obstet Gynecol* 2012;120:1029-36.
- [19] Steegers EA, von Dadelszen P, Duvekot JJ, et al. Pre-eclampsia. *Lancet* 2010;376:631e44.
- [20] Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *BMJ* 2005;330:565.
- [21] Changes in elective delivery (labour induction and caesarean section) are changing the distribution of gestational age at or near term. Increasing rates of early elective delivery before 40 weeks gestation have been reported internationally.
- [22] Yeast JD, Halberstadt C, Meyer BA, Cohen GR, Thorp JA. The risk of pulmonary
- [23] oedema and colloids osmotic pressure changes during magnesium sulfate infusion. *Am J Obstet Gynecol* 1993;169:1566-71.
- [24] Joseph KS, Demissie K, Kramer MS. Obstetric intervention, stillbirth, and preterm birth. *Semin Perinatol* 2002;26:250e9.
- [25] MacDorman MF, Declercq E, Zhang J. Obstetrical intervention and the singleton preterm birth rate in the United States from 1991e2006. *Am J Public Health* 2010;100:2241e7.
- [26] Rylander A, Lindqvist P. Eclampsia is more prevalent during the winter season in Sweden. *Acta Obstet Gynecol Scand* 2011;1:114-7.