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Risk factors and adverse outcomes of preeclampsia: a tertiary care centre-based study in China.

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Abstract

Purpose: To determine the adverse outcomes of preeclampsia in a tertiary care centre in China and to evaluate the associated risk factors.
Design: Case control study.
Patients and methods: Amid the reporting period from September 2014 to August 2015, 1312 women delivered in the referral center, out of which 192 (6.83%) women had preeclampsia.
Results: The frequency of preeclampsia was observed to be 6.83%. Compared to women in control group (n=192), preeclampsia group women are older in age (p=0.133), had more parities (p=0.323), lesser education level (p<0.001), higher spontaneous abortion history (p=0.433) and were living in urban areas. Significantly higher gestational age at delivery, caesarean delivery, and neonatal care unit admission, (all p<0.001) was noted in women with preeclampsia. With respect to adverse outcomes, significantly higher number of preterm deliveries, still births, low birth weight (all p<0.001), neonatal deaths (p=0.023) and maternal deaths (p=0.032) were noted in preeclampsia group. Significant association of parity and low education level with preeclampsia was noted. The preeclampsia risk was inversely associated with number of visits for prenatal care.
Conclusion: Our study demonstrated significantly higher gestational age at delivery, preterm delivery, caesarean delivery, neonatal care unit admission, still births, neonatal deaths and maternal deaths in cases.

Keywords: Maternal mortality, Perinatal, Preeclampsia, Pregnancy.

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Introduction

Preeclampsia is distinguished by hypertension as well as proteinuria during pregnancy and is usually diagnosed in nearly 3 to 4% of pregnancies altogether. It is a main source of maternal as well as perinatal morbidity. The most serious manifestation (eclampsia) is linked with maternal morbidity globally [1-3]. Preeclampsia is a disorder with obscure etiology that might occur via various pathways, as demonstrated by fluctuating phenotypes which are delegated early or late based on gestational age of onset and by preeclampsia severity [4,5].

Women with preeclampsia history have an increased risk of developing preeclampsia in consequent pregnancies [6-11], yet the probability/recurrence is defined inadequately; past studies have either incorporated a greater part of women delivered around 37 gestation weeks in whom the recurrence risk is low [12] or have depended on information which was taken from routinely gathered clinical data where the diagnosis might be imprecise [13]. Women with past preeclampsia who required delivery around 34 gestation weeks are of specific concern since it is perceived that they are at more serious risk of recurrence and severe foetal outcomes. The danger of the preeclampsia development in these ladies is additionally questionable on the grounds that past reports have been of atypical populaces and/or negligible numbers of women [11,14].

Recurrent preeclampsia has likewise been associated with advanced rates of Small for Gestational Age (SGA) infant delivery, preterm delivery, and perinatal death in comparison with in a first pregnancy preeclampsia [7,14]. Although a greater rate of related neonatal complications may be foreseen, this has not been researched formally. Preeclampsia remains a major cause of maternal as well as perinatal mortality and morbidity, and causes complications in 2-8% of overall pregnancies. In China, the preeclampsia prevalence is approximately 5%. Globally the preeclampsia incidence seems to be rising, probably due to the greater prevalence of obesity and medical comorbidities, advancing maternal age and the usage of assisted reproductive techniques [15,16].

Successful discovery and treatment of preeclampsia and eclampsia inside of any nation or health region ought to at any rate be impacted by knowledge of clinician on the prevalence of the disease within their practice area. Research into pre-eclampsia and/or eclampsia may help clinicians and caregivers in decision making.

As per our knowledge none of the studies focused on determination of the risk factors and adverse outcomes of preeclampsia in China. The present study objectives were to determine the adverse outcomes of preeclampsia in China and to evaluate the associated risk factors.

Methods

This case control study was performed in a Tertiary Hospital, China over a time of one year from September 2014 to August 2015.

The study target population included women with preeclampsia as cases and women with normal pregnancies (no preeclampsia) as controls. The study got the approval from the Ethics Committee and patient confidentiality was strictly maintained. We collected the data from medical records department. The clinical and demographics variables obtained were noted below: age, education, medical history, obstetric history, parity, prenatal care, Body Mass Index (BMI; calculated as weight in kilograms divided by the square of height in meters), number of prenatal visits, and residence. Data on adverse maternal as well as perinatal outcomes (preterm delivery, perinatal death (neonatal death or still birth), maternal death, low birth weight etc.) was also collected. Preeclampsia was considered as two readings of blood pressure of minimum 140 mmHg systolic or minimum 90 mmHg diastolic, or rises of 30 mmHg systolic or 15 mmHg diastolic from that of the baseline on minimum of two occasions at ≥ 6 hours apart) post 20th week of pregnancy and proteinuria in prior normotensive women.

Maternal death was considered as intra hospital death of woman that observed on or before eighth day postnatal. Perinatal death was outlined as early neonatal death (intra hospital infant death that took place on or before seventh day post-delivery) or stillbirth (fresh/macerated). Preterm birth was considered as live-birth at less than 37 gestational weeks. Birth weight of less than 2500 grams of a live born baby irrespective of gestational age was considered as low birth weight.

Statistical analysis

Values were expressed as numbers and percentage as well as mean with Standard Deviation (SD). The associations of risk factors were evaluated by logistic regression analysis. Student t-tests or Chi square tests were used for comparison of maternal as well as perinatal characteristics of cases and controls. Analysis of all data collected was done using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). P value ≤ 0.05 was regarded as significant statistically.

Results

Altogether, 1312 women delivered in this study amid the reporting period, out of which 192 (6.83%) women had preeclampsia. The mean age of women with preeclampsia (cases) was 29.8 (5.2 (SD)) years whereas 28.4 (6.4) years in case of controls.

Table 1. *Clinical/demographic characteristics and adverse outcomes in Chinese women with preeclampsia.*

Characteristics	Cases (n=192)	Controls (n=192)	P value	Logistic regression analyses	
				OR (95% CI)	P value
Age in years	29.8 (5.2)	28.4 (6.4)	0.133	0.9 (0.7-1.0)	0.182
BMI in kg/m^2	24.8 (2.3)	24.6 (2.2)	0.524	0.8 (0.7-1.0)	0.546
Education level					
≥ Secondary or higher	21/192 (10.9%)	45/192 (23.4%)	<0.001	1	
≤ Primary or less	171/192 (89.1%)	147/192 (76.6%)	<0.001	2.2 (1.7-6.1)	0.022
Spontaneous abortion history					
No	136/192 (70.8%)	141/192 (73.4%)	0.724	1	
Yes	56/192 (29.2%)	51/192 (26.6%)	0.433	1.3 (0.7-2.1)	0.304
Residence					
Urban	105/192 (54.7%)	105/192 (54.7%)	0.924	1	
Rural	87/192 (45.3%)	87/192 (45.3%)	0.933	0.7 (0.4-1.4)	0.122
Parity					
Primigravida	94/192 (48.9%)	49/192 (25.5%)	<0.001	2.7 (1.4-5.4)	<0.001
Parous	61/192 (31.8%)	109/192 (56.8%)	<0.001	1	
Multiparous	37/192 (19.3%)	34/192 (17.7%)	0.323	5.9 (3.4-10.4)	<0.001
Prenatal care					
No	104/192 (54.2%)	57/192 (29.7%)	<0.001	13.9 (6.4-24.2)	<0.001
1 or 2 visits	76/192 (39.6%)	68/192 (35.4%)	0.275	7.1 (3.4-15.4)	<0.001
>2 visits	12/192 (6.3%)	67/192 (34.9%)	<0.001	1	
Haemoglobin, g/L	96 (15)	96 (14)	0.932	0.8 (0.7-1.0)	0.332
Male neonate	98/192 (51%)	96/192 (50%)	0.856	1.2 (0.8-2.1)	0.527
Gestational age at delivery, wk	36.4 (2.5)	38.2 (1.3)	<0.001	-	-
Preterm delivery	61/192 (31.8%)	7/192 (3.6%)	<0.001	-	-

Caesarean delivery	148/192 (77.1%)	14/192 (7.3%)	<0.001	-	-
Neonatal care unit admission	98/192 (51%)	14/192 (7.3%)	<0.001	-	-
Neonatal death	11/192 (5.7%)	0	0.023	-	-
Still birth	27/192 (14.1%)	2/192 (1.0%)	<0.001	-	-
Birth weight (g)	1612.9 (582)	3024.5 (325)	<0.001	-	-
Maternal death	8/192 (4.2%)	0	0.032	-	-

BMI: Body Mass Index; CI: Confidence Interval; OR: Odds Ratio.

Values are expressed as numbers and percentage/mean with standard deviation.

The clinical/demographic characteristics and adverse outcomes in Chinese women with preeclampsia including age, Body Mass Index (BMI), education level, medical history, obstetric history, parity, prenatal care, maternal as well as perinatal outcomes, haemoglobin and residence etc. are presented in Table 1.

Compared to women in control group, preeclampsia group women are older in age (p=0.133), had more parities (p=0.323), lesser education level (p<0.001), and higher spontaneous abortion history (p=0.433). More women in preeclampsia group were living in urban areas (54.7%). Largest group of the women were with primigravida (48.9%). Significantly higher gestational age at delivery, caesarean delivery, and neonatal care unit admissions, (all p<0.001) was noted in women with preeclampsia. With respect to adverse outcomes, significantly higher number of preterm deliveries, still births, low birth weight (all p<0.001), neonatal deaths (p=0.023) and maternal deaths (p=0.032) were noted in preeclampsia group. There were 8 (4.2%) maternal deaths in the preeclampsia group, compared to no maternal death in the control group.

There was no significant association noted for age, BMI (calculated as weight in kilograms divided by the square of height in meters), residence and haemoglobin. Parity as well as low education level was found to be significantly associated with preeclampsia as shown in Table 1. The preeclampsia risk was found to be inversely associated with the number of visits for prenatal care as shown in Table 1.

Discussion

The frequency of preeclampsia observed in the present study was 6.83%. These frequencies were found to be higher than those reported in Sudan, where 3.5% preeclampsia prevalence was noted [17] and 5 out of 1000 were affected by eclampsia [18] and lower than those reported in Yemen, where 7.6% prevalence of preeclampsia was noted [19]. Also, in a multicenter study conducted recently [20], the prevalence of preeclampsia was noted to be 3.9%. In a study conducted by Surapaneni et al. reported rates of recurrent preeclampsia have large differences: women without a history of preeclampsia had preeclampsia pregnancy rates of 0.7% to 1.8%, while the women with history of preeclampsia during pregnancy had preeclampsia incidence of up to 26.8% ~ 28.0% [21]. In Hernandez-Diaz et al. study [5], a large sample data suggested 3.0% preeclampsia prevalence in pregnant women. The variability in frequencies of preeclampsia is probably not just denotes the variability of maternal risk factors distribution, however likewise be ascribed to contrasts in the facility as well as country characteristics, like diagnostic capacities or service accessibility etc.

Significantly higher gestational age at delivery, caesarean delivery, and neonatal care unit admissions was noted in women with preeclampsia. With regards to adverse outcomes, significantly higher number of preterm deliveries, still births, low birth weight, neonatal deaths and maternal deaths were noted in preeclampsia group. There was no significant association noted for age, BMI, residence and haemoglobin. Parity as well as low education level was found to be significantly associated with preeclampsia. The preeclampsia risk was found to be inversely associated with the number of visits for prenatal care. A study by Bilano et al. [20] demonstrated similar findings where primiparity as well as lack of prenatal care was shown to be the major predictors for preeclampsia. Also, high parity, lack of education, primiparity, and prenatal care were considered as the major predictors for preeclampsia in studies conducted in Sudan and Yemen [17,19]. Significant association of maternal mortality with preeclampsia was demonstrated in studies conducted by Adam GK et al. and Bilano et al. [18,20]. High frequency of caesarean deliveries and the birth weight deviations and association with preeclampsia history were reported in a study by de Oliviera et al. [22]. Preeclampsia history is an independent risk factor for preeclampsia recurrence, while it is influenced by many other factors.

Certain inherent limitations need to be considered during interpretation of the results of current study. This single-centre study has a restricted number of patients hence the generalization of results should be made with care. We were unable to evaluate all variables and were restricted by the treating physicians with respect to completeness of or proper documentation. Limited information was captured on the preeclampsia severity and the patient management.

Conclusion

Our data demonstrated significantly higher gestational age at delivery, preterm delivery, caesarean delivery, neonatal care unit admission, still births, neonatal deaths and maternal deaths in women with preeclampsia. Parity as well as low education level was found to be significantly associated with preeclampsia whereas the number of visits for prenatal care was inversely associated with preeclampsia risk. Future robust studies are needed in this area for research. Health education ought to be underlined to urge women to have children at younger age relatively. Special measures ought to be taken for proper risk factor identification (close monitoring), mobile midwives who can visit non-attenders, and enhancement of the living conditions as well as prenatal care in the small towns and countryside.

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