Incidence and Risk Factors of Pre-eclampsia Among Iraqi Pregnant women

AnmarAltaei*
Jumah Masoud Mohammad**
[*]Department of Pharmacotherapeutics, University of Al-Mustansyria, Baghdad, Iraq
[**]Department of Pharmaceutics, University of Al-Mustansyria, Baghdad, Iraq

الخلاصة:

تسمم الحمل هو أحد إضطرابات الحمل الأكثر أهمية والتي تؤدي إلى نتائج سيئة لدى كل من الأم والجنين، وهناك العديد من عوامل الخطر المرتبطة بها والتي تزيد من عملية مرض تسمم الحمل.

أستحدثت العديد من الفرضيات لتفسير كيفية حدوث هذا المرض بعد 20 أسبوعا من الحمل، وتعتمد الفرضيات الأكثر قبولاً على كل من الاختلال المناعي والوعائي.

تم تصميم هذه الدراسة السريرية لتقييم حدوث عوامل الخطر الأكثر شيوعا التي ارتبطت مع تسمم الحمل. تم أعتماد (100) مائة حالة من المصابين بمرض تسمم الدم كعينة مرضى و(60) من الحوامل كمجموعة سيطرة، وقد تم تدوين وتسجيل كل التاريخ الطبي والسريري للمرضى المشاركين.

أظهرت الدراسة أن هناك بعض عوامل الخطر المرتبطة بشكل كبير مع حدوث تسمم الحمل($P< 0.05$) والتي اشتملت على مدة الحمل ($P<0.002$)، والتاريخ العائلي ($P<0.001$)، والحمل المتعدد($P–0.009$)، والإجهاض السابق ($P<0.001$)، والتاريخ الطبي بما في ذلك التهاب المسالك البولية وداء السكري ($P<0.001$)، والحالة الاجتماعية ($P<0.002$)، في حين لم يكن لعمر الأم ($P–0.81$) والعامل الريسي Rh ($P<0.985$) أي تأثير معنوي لحدوث تسمم الحمل.

تشير هذه النتائج الى أن عمر الحمل، والتاريخ العائلي، والحمل المتعدد، والإجهاض السابق، والتاريخ الطبي بما في ذلك التهاب المسالك البولية وداء السكري والحالة الاجتماعية من العوامل الهامة في تقييم وتشخيص تسمم الحمل من قبل أخصائيو القبالة والتوليد.

Abstract:

Pre-eclampsia is one of the most important gestational disorders that lead to both maternal and fetal bad outcomes. There are many risk factors that are associated and augment the disease process of pre-eclampsia. Many hypotheses have been introduced to explain why such condition is obviously seen after 20 weeks′ gestation. The most accepted of these relies on both immunological and vascular involvement. This clinical study was designed to evaluate and report the incidence of the most common risk factors that were associated with pre-eclampsia.

One hundred pre-eclamptic patients and (60) normal pregnant women as controls were collected where all pregnant women received a detailed inquiry

about their pregnancies, medical histories and antenatal cares. The study showed that there were certain risk factors significantly associated with pre-eclampsia incidence $P<0.05$ and these were gestational age (P-0.002), family history ($P<0.001$), multifetal pregnancy (P-0.009), previous abortion ($P<0.001$), medical history including UTI and DM ($P<0.001$) and social status (P-0.002), where as maternal age (P-0.81) and Rh factor (P-0.985) were insignificant risk factors for pre-eclampsia incidence.

These findings suggest that gestational age, family history, multifetal pregnancy , previous abortion , medical history including UTI and DM and social status should be considered as important determent risk factors in the evaluation and diagnosis of pre-eclampsia by obstetricians.

Introduction:

Pre-eclampsia is a heterogeneous disorder with variable maternal and fetal manifestations [1]. It is, a pregnancy-specific syndrome clinically defined as elevated blood pressure with proteinuria that remains an important cause of maternal and fetal morbidity and mortality despite intensive research[2,3].

It is manifested during the latter half of gestation and is diagnosed by the presence of hypertension, proteinuria, and edema in pregnant women previously without such findings. The physiologic manifestations involve a generalized increase in vasoconstriction and vasoreactivity which decreases the uteroplacental perfusion and results in placental hypoxia. Long-lasting placental hypoxia can in turn lead to foetal growth retardation[4], preterm birth, and maternal and perinatal deaths,decreased organ perfusion, and platelet activation[5].

The exact etiology of pre-eclampsia is still unknown. Genetic, immunologic factors and abnormal placentation have been proposed to play a causative role. Failure of trophoblastic invasion of the maternal spiral arteries, leading to increased vascular resistance of the uterine arteries and decreased uteroplacental blood flow and subsequent liberation of cytotoxic factors[6,7]. These factors may result in endothelial damage clinically manifested by a systemic maternal syndrome [8,9].

The aim of this study is to assess and evaluate the most noticeable risk factors associated with the incidence of preeclampsia among pregnant women.

Key words: pre-eclampsia, risk factors

Materials and Methods:

This study was carried out under follow up of specialist physicians on (100) pre-eclamptic women (serve as patients) and (60) normal pregnant women (serve as controls) and collected at the Department of Obstetrics and Gynecology, Al-Yarmook Training Hospital between October 2010 and April 2011.

Certain exclusion criteria were followed to avoid interference of any other factors like drugs that increase blood pressure as β2-agonists or corticosteroids and pathological conditions with this research e.g. pregnancies complicated with chromosomal or structural anomalies. Every pregnant received a detailed inquiry about her pregnancy, medical history and antenatal care. Pregnant women suffering from pre-eclampsia were defined as having a blood pressure of at least 140/90 mmHg measured on two occasions accompanied by proteinuria of at least 300 mg per 24 hours, or at least 1+ on dipstick testing after 20 weeks. Maternal age, gestational age, social status, family history, history of spontaneous abortion, previous pre-eclampsia, mother's Rh status, multifetal gestation, diabetius mellitus (overt or gestational) were evaluated as potential risk factors for pre-eclampsia.

Statistical analysis:

The results were expressed as numbers and percentages; chi-square is used to examine the degree of significance which is considered significant as P value <0.05.

Results:

Table (1) illustrate the variable risk factors associated with the incidence of pre-eclampsia in pregnant women regarding maternal age, gestational age, family history, multifetal pregnancy, previous abortion, medical history, Rh factor, and social outcome.

This table presents that both maternal age and Rh factor are insignificantly associated with pre-eclampsia incidence P>0.05 (0.81, 0.985) respectively. However, the results according to the chi-square analysis present that gestational age (0.002), family history (<0.001), multifetal pregnancy (0.009), previous abortion (<0.001), medical history (<0.001) as well as social status (0.002) all are correlated significantly as risk factors for pre-eclampsia incidence (P<0.05).

Risk factors		pre-eclampsia (100 pregnant women) No. of pregnant women -(%) of pregnant women	Control group (60 pregnant women) No. of pregnant women -(%) of pregnant women	p value
Maternal age	15-24 yr 24-34yr 34-40yr	33- 64.7% 32- 51.6% 35- 74.5%	18- 35.3% 30- 48.4% 12-25.5%	0.81(NS)
Gestational age	20-27wk 27-33wk 33-39wk	20- 69% 27- 45 % 53-74.6%	9-31% 33-55% 18-25.4%	0.002(S)
Family history	Yes No	32- 37.2% 68- 91.9%	54-62.8% 6-8.1%	<0.001(S)
Multifetal pregnancy	Yes No	20- 87% 80- 58.4%	3-13% 57-41.6%	0.009(S)
Previous abortion	Yes No	36- 85.7% 64- 54.2%	6-14.3% 54-45.8%	<0.001(S)
Medical history	UTI DM Others Normal	20- 100% 27- 79.4% 8-53.3% 45-49.5%	0- 0% 7-20.6% 7-46.7% 46-50.5%	<0.001(S)
Rh factor	A+ AB+ B+ O+ others	21- 63.6% 12- 63.5% 22- 64.7% 30-58.8% 15-62.5%	12-36.4% 6-37.5% 12-35.3% 21-41.2% 9-37.5%	0.985(NS)
Social status	Homework Worker	76-57.1% 24- 88.9%	57-42.9% 3-11.1%	0.002(S)

Table-1: The most common causative risk factors those are associated with pre-eclampsia in 160 pregnant women

Discussion:

Pre-eclampsia is a multisystemic, pregnancy specific disorder that is diagnosed by new-onset hypertension and proteinuria after 20 weeks gestation [10]. It is a common obstetric complication that leads to maternal and perinatal morbidity and mortality in both developed and developing countries [11].

The results of this study present that there are certain risk factors significantly associated and augment the incidence of pre-eclampsia in pregnant women whereas there are other factors insignificantly associated with pre-eclampsia incidence.

One of these risk factors that have great effect on pre-eclampsia is gestational age, in the present study as shown in table 1, pre-eclmpsia incidence is significantly higher among both pregnant women with gestational age between 33-39 weeks (74.6%) and 20-27 weeks (69%) while the incidence is lower among pregnant women at 27-32 weeks′ gestation (45%). The results of

this study agree with that one performed by Dorothea Mostello et al [12], in a population-based, cohort study on women who had 2 singleton births between 1989 and 1997: 6157 women with preeclampsia and 97,703 women without preeclampsia at the time of their first deliveries and found at the time of their second delivery, 14.7% women with prior preeclampsia developed recurrent pre-eclampsia. The risk of recurrent pre-eclampsia is inversely related to gestational age at the first delivery: 38.6% for 28 weeks' gestation or earlier, 29.1% for 29-32 weeks, 21.9% for 33-36 weeks, and 12.9% for 37 weeks or more.

Family history is another usual risk factor for any medical condition. In this study there was a strong correlation between family history and pre-eclampsia incidence (37.2%) as shown in table-1. This study's result is in agreement with that done by Kirsten Duckitt et al [13], who presented that the risk of pre-eclampsia is increased in women with family history (2.90, 1.70 to 4.93) by systematic review of controlled studies published 1966-2002 and also in agreement with a prospective study done by R.B. Cincotta et al [14] on 368 primigravida, and found that a family history of pre-eclampsia is associated with a fourfold increased risk of severe pre-eclampsia.

Another risk factor for the demonstration of pre-eclampsia incidence is multifetal pregnancy. Table I shows the effect of twin pregnancy on the incidence of pre-eclampsia where it was significantly higher among pregnant females who have twin pregnancy (87%) than those who have singleton. The results of this study is in accordance with that performed by M. D. Savvidou et al[15] ,who found that the incidence of pre-eclampsia in monochorionic twin pregnancies (9.4%) was not significantly different from that in dichorionic pregnancies (7.3%) on 666 twin pregnancies but significantly different if compared to singleton pregnancy. Baha M. Sibai MD et al [16], in secondary analysis of prospective data from women with twin and singleton gestations and found that the rates for both gestational hypertension and pre-eclampsia are significantly higher among women with twin gestations than among those with singleton gestations.

It could be hypothesized that the large placental size in multiple birth pregnancies, leading to higher maternal exposure to paternal antigen [17] or impaired placentalperfusion [18].

Previous abortion seems to be another risk factor in this study as presented in table I, the incidence of pre-eclampsia is significantly higher in those pregnant women who had previous history of abortion (85.7%) than those who were not. The results of this study are in agreement with that performed by Cambell et al [19] who suggested that neither spontaneous abortion nor an induced termination of pregnancy offer substantial protection as compared to a first pregnancy carried to term while it is in disagreement with those performed

by Phanida Luealon, et al [20] who found that previous abortion is a protective factor against the incidence of pre-eclampsia.

The most important observed risk factor for pre-eclampsia is pregnancy medial history and one of these medical conditions is urinary tract infection (UTI). In this study, pregnant women with UTI are major prone to suffer from pre-eclampsia than other medical conditions as shown in table I (100%). The possible cause for this strong association between UTI and pre-eclampsia might be related to arterial damage triggered by infection, resulting in relative uteroplacental ischemia [21].

Our results are consistent with that performed by Hsu et al. [22] in a retrospective study of 13,852 pregnant women who found that patients with preeclampsia experienced significantly more urinary tract infections than did non-hypertensive patients as well as Mittendorf et al. [23], who observed that urinary tract infection during pregnancy was associated with nearly a two-fold increased risk for pre-eclampsia.

Another important medical disease that is considered as a risk factor for pre-eclampsia incidence is diabetes mellitus. Hypertensive disorders are increased two- to threefold in pregnancies complicated by diabetes. The possible explanations for this association are due to more alteration in lipid metabolism of pregnant diabetics compared with that of nondiabetics [24] where high plasma triglyceride levels among diabetic women could cause endothelial cells accumulation of these lipids [25], leading in turn to endothelial dysfunction; as well as increased urinary excretion of thromboxane metabolites that acts as a so constrictor and stimulates platelet aggregation in diabetic hypertensive women than in non diabetics[26]. These facts explain the significant incidence of pre-eclampsia with medical history of DM in pregnant women in this study compared with those who had no DM as shown in table 1I(79.4%). The results of this study are in consistent with those done by Helena Salonen Roset al [27] in a population-based cohort study on 10,666women and found both of gestational diabetes and type I diabetes were significant risk factors associated with increased risk of pre-eclampsia.

Both of occupation and working conditions have been associated with various pregnancy adverse outcomes, including low birth weight and preterm delivery [28]. The results of this study in table 1 show that pre-eclampsia incidence is highly related to those women who are workers (88.9%) and these results are coincide with some studies that found an increased risk for pre-eclampsia among women who worked during their pregnancy compared with women who did not [29]. The explanation for this association is unknown, but it has but suggested that the stress of work leads to an increased release of catecholamines and a daylong sympathetic response and overactivity in pre-eclampsia that increases blood pressure [10].

Conclusion:

From the results and discussion of this study, we conclude that the incidence of pre-eclampsia is higher in pregnant women with certain risk factors as gestational period, family history, multifetal pregnancy, previous abortion, medical history of UTI and DM and the outcome of social status, so multi-factors collectively are associated with this disease that ultimately lead to more intense condition. However, one of the limitations of this study is that not all of the risk factors have been included and assessed in this study.

References:

1 - Moldenhauer, J.S.; Stanek, J.; Warshak, C.; Khoury, J. and Sibai, B. (2003). The frequency and severity of placental findings in women with preeclampsia are gestational age dependent. Am J Obstet Gynecol; 189: 1173–1177.

2 - Geary, M. (1993).The HELPP syndrome. J Obstet Gynaecol. Vol. (104). P.887-91.

3 - Roberts, JM. and Redman, CW .(1993). Pre-eclampsia more than pregnancy imduced hypertension. Lancet.Vol.(341).P. 1447-51

4 - National High Blood Pressure Education Program Working Group. Report on High Blood Pressure in Pregnancy. National Institutes of Health Publication No. 00-3029. Washington DC: National Institutes of Health, 2000.

5 - Chesley, L. (1984). History and epidemiology of preeclampsiaeclampsia. Clin Obstet Gynecol.Vol. (27). P.801-20.

6 - Lin ,S.; Shimizu, I.; Suehara, N.; Nakayama, M. and Aono, T. (1995). Uterine artery Doppler velocimetry in relation to trophoblast migration into the myometrium of the placental bed. Obstet Gynecol .Vol. (85).P.760-5.

7 - Phupong, V.; Dejthevaporn ,T.; Tanawattanacharoen, S.; Manotaya, S.; Tannirandorn, Y. and Charoenvidhya, D. (2003). Predicting the risk of preeclampsia and small for gestational age infants by uterine artery Doppler in low-risk women. Arch Gynecol Obstet.Vol. (268).P.158-61.

8 - Roberts, J.M.; Taylor, R.N.; Musci, T.J.; Rodgers, G.M.; Hubel, C.A. and McLaughhn, M.K. (1996). Preeclampsia an endothehal cell disorder .Am J Obstet Gynecol. Vol. (161). P. 1200-1.

9 - De Groot, C.J.M. and Taylor, R.N. (1996). Preeclampsia an update. Eur J Obstet Gynecol Reprod Biol. Vol. (69). P. 59-60.

10 - Korravaran Yodmai. Thesis (2007). Incidence and Risk Factors in Ramathibodi Hospital. Faculty of Graduate studies, Mahidol University. P.6.

11 - Sibai, B.; Dekker, G. and Kupferminc, M. (2005). Pre-eclampsia. Lancet.Vol. (365). P. 785-99.

12 - Dorothea Mostello; Dorina Kallogjeri; Rachata Tungsiripat and Terry Leet. (2008). Recurrence of preeclampsia: effects of gestational age at delivery of the first pregnancy, body mass index, paternity, and interval between births. American Journal of Obstetrics & Gynecology. Vol. (199) (1). P.55.e1-55.e7.

13 - Kirsten Duckitt and Deborah Harrington. (2005). Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. BMJ. Vol. (12). P.330.

14 - Cincotta, R. B.; and Brennecke, S. P. (1998). Family history of pre-eclampsia as a predictor for pre-eclampsia in primigravidas. International Journal of Gynecology & Obstetrics. Vol (60). P. 23-27.

1 5 - Savvidou, M. D.; E. Karnastasi, C.; Skentou, L.; Geerts and Nicolaises, K. H. (2001). Twin chorionicity and pre-eclampsia. Ultrasound Obstet Gynecol; Vol (18).P 228–231.

16 - Baha, M.; Sibai John Hauth; Steve Caritis, et al. (2000). Hypertensive disorders in twin versus singleton gestations. American Journal of Obstetrics and Gynecology. Vol. (182).(4).P. 938-942.

17 - Sibai, B. Immunologic aspects of preeclampsia (1991). Clin Obstet Gynecol Vol. (34). P. 27-34.

18 - Roberts, J. and Redman, C. (1993). Pre-eclampsia: more than pregnancyinduced hypertension. Lancet. Vol. (341). P.1447-51.

19 - Cambell, O.M. and MacGillivray, I. (1985). Carr-Hill R. Pre-eclampsia in second pregnancy. Br J Obstet Gynaecol. Vol. (92).P.131-146.

20 - Phanida Luealon and Vorapong Phupong. (2010). Risk Factors of Preeclampsia in Thai Women. J Med Assoc Thai .Vol. (93).P. 6.

21 - Von Dadelszen, P. and Magee, LA. (2002). Could an infectious trigger explain the diVerential maternal response to the shared placental pathology of preeclampsia and normotensive intrauterine growth restriction? .Acta Obstet Gynecol Scand.Vol. (81).P.642–648.

22 - Hsu, C. D.; & Witter, F. R. (1995). Urogenital infection in preeclampsia. Journal of Obstetrics and Gynaecology.Vol. (49)P. 271–275.

23 - Mittendorf, R.; Lain, K.Y.; Williams, M.A. and Walker, C.K. (1996). Preeclampsia. A nested, case-control study for risk factors and their interactions. Journal of Reproductive Medicine.Vol. (41).P.491-496.

24 - Knopp, R.; Warth, M. and Carrol, C. (1973). Lipid metabolism in pregnancy. I. Changes in lipoprotein triglyceride and cholesterol in normal pregnancy and the effects of diabetes mellitus. J Reprod Med.Vol. (10). P.95-106.

25 - Endresen, M.; Lorentzen, B. and Henriksen, T. (1992). Increased lipolytic activity and high ratio of free fatty acids to abumin in sera from women with preeclampsia leads to triglyceride accumulation in cultured endothelial cells. Am J Obstet Gynecol. Vol. (167).P.440-7.

26 - Van Assche, A., Spitz, B.; Hanssens, M. (1993). Increased thromboxane formation in diabetic pregnancy as a possible contributor to preeclampsia. Am J Obstet Gynecol. Vol.(168). P.84-7.
27 - Innes, K.E. and Wimsatt, J.H. (199). Pregnancy-induced hypertension and insulin resistance: evidence for a connection. Acta Obstet Gynecol Scand.Vol. (78) .P.263–284.
28 - Cerón-Mireles, P.; Harlow, S.D.; Sánchez-Carrillo, C.I. and Núñez, R.M. (2001). Risk factors for pre-eclampsia/eclampsia among working women in Mexico City. Paediatr Perinat Epidemiol.Vol.15 (1). P.40-6.
29 - Eskenazi, B.; Fenster, L. and Sidney, S. (1991). A multivariate analysis of risk factors for preeclampsia. AMA. Vol.266 (2). P.237-41.