ENVIRONMENTAL RISK FACTORS ON PREECLAMPSIA AND HELLP SYNDROME

Submitted by

Wafaa Hamed Abd EL-Salam Zahran
M.B.B CH Faculty of Medicine, Cairo University, 1985
Diploma of Obstetrics and Gynecology,
Faculty of Medicine, Ain Shams University, 1994

A Thesis Submitted for Partial Fulfillment

Of

Requirements for the Master Degree

In

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Department of Environmental Medical Science
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This thesis Towards a Master Degree in Environmental Science Has been Approved by:

Name	Signature
1-Prof. Dr. Mahmoud Serry El Bokhary Prof. of Chest Diseases, and Head of Department of Environmental Medical Sciences Institute of Environmental Studies & Research Ain Shams University	
2-Prof. Dr. Sherif M. Salah El-Din Abd El-Salam Prof. of Obsterics and Gynecology Faculty of Medicine Menofia University	
3-Prof. Dr. Hala Ibrahim Awad Allah Prof. f Public Health, in Department of Environmental Medical Sciences Institute of Environmental Studies & Research Ain Shams University	
4-Prof. Dr. Mahmoud Sayed El Edessy Prof. of Obsterics and Gynecology Faculty of Medicine Al Azhar University	

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Under the supervision of:

1- Professor Dr. Mahmoud Serri El Bokhary
Professor of Chest Diseases
Chairman, Department of Medical Science
Ain Shams University

2- Professor Dr. Sherif M. Salah El-Din Abd El-salam
Professor of Obstetrics and Gynecology
Menofia University

2015

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Wafaa Zahran

Abstract

Preeclampsia is a hypertensive condition arise in pregnant women mainly during the third trimester. Eclampsia, an acute progression of preeclampsia.Involves seizures and coma.

HELLP syndrome is named for an abbreviation of the main symptomatic conditions used to diagnosis the condition, hemolytic anemia, elevated liver enzymes and a low platelet count. This condition, like preeclampsia and eclampsia, generally occurs during the later stages of pregnancy, but can sometimes surface even after childbirth. The exact cause of the disease is unknown, and there is no known way to prevent it from occurring; however certain risk factors may allow doctors to assess risk levels during pregnancy.

Few environmental risk factors for hypertensive disorders of pregnancy have been examined. However several studies have shown an association between obesity, sager smoking, diabetes and air pupation with hypertension tension in general.

In the study we examine the relation between these environmental changes an the incidence of hypertension and HELLP syndrome.

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List of Abbreviations

Abb.	Full term
2D	Two dimensional
AC	Abdominal circumference
ARDS	Adult respiratory distress syndrome
BMI	Body mass index
BPD	Bipartial dimater
Cm	Centimeter
CO	Carbon monoxide
CRP	C reactive protein
DIC	Disseminated intravascular coagulation
EPH	Aedema, protenuria, hypertention.
FL	Femur length
GDM	Gestational diabetes mellitus
h	Hour
HDL	High Density lipoprotein
HDP	Hypertensive disorders in pregnancy
HELLP	Syndrome Haemolytic anaemia, elevated liver enzymes, low platelet count
Ho	Hemoxygenase
IGFBP-1	Insulin-like growth factor–binding protein
IQ	Intelligence quotients
NO=	Nitrous oxide
No_2	Nitrogen dioxide
NOx	Nitrogen oxides
O_3	Ozone

List of Abbreviations

Abb.	Full term
OGCT	Oral glucose challenge test
OGTT	Oral glucose tolerance test
OR	Odds ratio
PE	Pre-eclampsia
PIH	Pregnancy induced hypertension
PM_{10}	Parteculate matter less than 10 micrometer
$PM_{2.5}$	Particulate matter less than 2.5 micrometer
RBS	Random blood sugar
Rh typing	Rhesus typing
sEng	Soluble endoglin
sFlt1	Soluble fms=like tyrosine kinase
SGA	Small for gestational age
SHBG	Sex hormone-binding globulin
T_2DM	Type 2 diabetes
t-PA	Tissue plasma activator antigen

INTRODUCTION

Hypertensive disorders during pregnancy are among the leading causes of maternal and neonatal morbidity worldwide, and include pregnancy induced hypertension (PIH) and preeclampsia. PIH and preeclampsia complicate about 7% of all pregnancies and severe preeclampsia is a major cause of sever maternal morbidity (e.g stroke and liver rupture) ***(Roberts and Lain, 2002).***

Evidence for the influence of environmental and occupational factors is contradictory to a few studies that have suggested that these factors may play a role in the etiology of hypertensive disorders during pregnancy**.** However, the underlying mechanisms for occupational risk factors, such as physically demanding work and exposure to chemicals, are unclear ***(Wigle et al., 2008).***

Preeclampsia and eclampsia

Preeclampsia is a hypertensive condition that arises in pregnant women mainly during the third trimester. The diagnosis refers to a set of symptoms rather than a specific cause. It seems to occur when substances from the placenta cause a dysfunction of the endothelial or inner walls of the blood vessels in a susceptible pregnant woman, leading to damage of the kidneys, liver and blood vessels. Early onset preeclampsia occurs before 32 weeks and is generally associated with increased rates of fatality. Eclampsia, an acute progression of preeclampsia.Involves seizures and coma.

HELLP syndrome is named for an abbreviation of the main symptomatic conditions used to diagnosis the condition, hemolytic anemia, elevated liver enzymes and a low platelet count. This condition, like preeclampsia and eclampsia, generally occurs during the later stages of pregnancy, but can sometimes surface even after childbirth. The exact cause of the disease is unknown, and there is no known way to prevent it from occurring; however certain risk factors may allow doctors to assess risk levels during pregnancy.

Although hypertensive disorders in pregnancy (PIH) affect only 5% -10% of all pregnancies, they are still one of the leading causes of maternal and perinatal morbidity and mortality ***(Geary, 1997).*** HELLP (hemolysis, elevated liver enzymes and low platelets) syndrome has been associated with maternal mortality in around 2/1000 cases and perinatal mortality in around 370/1000 cases. The risk for poor maternal-perinatal outcome makes HELLP syndrome a frightening experience which strongly influences the decision on any future pregnancy. Counseling of the patients is complicated by the sparse data on the recurrence risk for hypertensive diseases following an index pregnancy complicated by HELLP syndrome. In addition, study results investigating the recurrence risk after HDP vary from 2.5% to 29% ***(Sep et al., 2009)***. The relatively low incidence of HELLP syndrome makes it difficult to recruit study groups large enough to determine recurrence risk ***(Barton & Sibai, 1992)***.

Obesity is associated with adverse fetal and pregnancy outcomes, including a higher risk of preeclampsia, gestational diabetes, fetal macrosomia, labor dystocia and cesarean delivery ***(Cnattinguis et al., 1998)***.

Few environmental risk factors for hypertensive disorders of pregnancy have been examined. However several studies have shown an association between pesticides and hypertension in general ***(Smith et al., 2005)***. We recently reported an association between pesticide exposure during pregnancy and gestational diabetes. Because insulin resistance is an known risk factor for PE, In the study we sought to examine the relation between pesticide exposure during pregnancy and the development of PIH and PE ***(Saldana et al., 2007)***.

Aim of the Work

The aim this study is to assess the incidence of preeclampsia and HELLP syndrome in pregnancies complicated by diabetes, obesity, pesticide exposure and in pregnant women who are cigarette smokers.

PREECLAMPSIA

Preeclampsia is a hypertensive disorder of human pregnancy. It occurs in 5%–7%of all pregnancies and is a leading cause of maternal and fetal morbidity and mortality. Preeclampsia places the mother at risk of convulsions (eclampsia), kidney failure, liver failure and death. Worldwide, it is a leading cause of maternal death together with bleeding and puerperal sepsis. Preeclampsia also places the fetus at risk. It is a leading cause of both premature delivery and intrauterine growth restriction.

Fifteen per cent of preterm deliveries are due to preeclampsia, and the neonatal mortality rate of babies born to preeclamptic mothers is five times higher than that of babies born to mothers with normal pregnancy. Clinically, preeclampsiais defined as hypertension (blood pressure 140/90 millimeter mercury) and proteinuria (urinary protein 300 milligram/24 hours). It is also associated with pathological edema, coagulation abnormalities and decreased uteroplacental blood flow. The pathophysiology of preeclampsia includes an imbalance between thromboxane (a potent vasoconstrictor) and prostacyclin (a potent vasodilator); this imbalance favors thromboxane, oxidative stress, activation of circulating leukocytes and vascular cell dysfunction ***(Walsh, 2004).***

Preeclampsia is a pregnancy-specific form of hypertension that presents a major health problem worldwide. The main stay of therapy for preeclampsia remains clinical recognition through prenatal care and termination of the disease process with delivery. Maternal mortality has been reduced in the United States, but in countries where prenatal care is