



## The Association between Congenital Heart Disease in Infants and Preeclampsia

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### Abstract

**Introduction:** Preeclampsia and Congenital heart disease shared angiogenic pathways in both conditions. There is evidence of angiogenic imbalance in women carrying fetuses with major congenital heart defects and in fetuses terminated because of these defects. Either way, the data suggested that excessive antiangiogenesis early in pregnancy may play a role in the origin of at least some congenital heart defects.

**Objective of the Study:** Mini review of 3 international studies about the association between Congenital Heart Disease in infants and Preeclampsia.

**Studies:** We reviewed 3 studies from Denmark, Nigeria and Canada all chord studies, some of them collected the pregnant women and others collected the infants.

**Results:** All studies confirm the association between the Congenital Heart Disease in infants and Preeclampsia.

**Conclusion:** The absolute prevalence of congenital heart defects was higher for infants of women with preeclampsia than those without it. So, it is important to do the screening fetal heart scan for the women who had preeclampsia and after birth Echo for their newborns.

**Keywords:** Congenital Heart Disease; Preeclampsia

### Introduction

Congenital heart disease (CHD) are the most common anomalies in infants, CHD play an important role in infant morbidity and mortality [1-3].

The causes and risk factors for congenital heart defects are mostly unknown.

Pregnancy events and diseases (like preeclampsia, diabetes...) usually can be risk factors for congenital heart defects in newborns [1-3].

Preeclampsia is defined as hypertension and proteinuria developing after 20 weeks of gestation in women who were previously normotensive.

Preeclampsia and Congenital heart disease shared angiogenic pathways in both conditions [1-3].

There is evidence of angiogenic imbalance in women carrying fetuses with major congenital heart defects and in fetuses terminated because of these defects. The data were consistent with either a fetal or maternal origin for the angiogenic imbalance. A fetal imbalance toward antiangiogenesis at the trophoblast stage could result in abnormal heart formation, with subsequent transplacental fetal distress signals triggering a maternal response. Alternatively, a maternal antiangiogenic state might reduce trophoblast invasion of the spiral arteries, leading to placental hypoxia, fetal hypoxia, fetal overproduction of antiangiogenic factors, and abnormal heart development. Either way, the data suggested that excessive

antiangiogenesis early in pregnancy may play a role in the origin of at least some congenital heart defects [1-3].

Antiangiogenesis in preeclampsia that becomes more marked with prematurity and increasing disease severity [3-5].

### Studies

An association between maternal hypertensive disorders of pregnancy and offspring congenital heart defects is therefore biologically plausible and would suggest that the same underlying processes contribute to the pathophysiology of both conditions [1-3].

The association is challenging to study. There was many studies about this association [1-7].

NO	Study	Type	Date /Sample	Sample number
1	Denmark	Cohort	Pregnancies ending in live birth between 1978 - 2011	1 972 857 woman
2	Nigeria	Cohort	90 neonates between 4/2017 - 5/2018	90 infant
3	Canada	Cohort	Infants born > 20 gestational weeks between 1989 - 2012	1 942 072 infants

### Results

We observed strong associations between congenital heart defects and risk of preterm preeclampsia both in the same pregnancy and across pregnancies. Our findings support a predominantly maternal origin of effect, although they do not rule out an additional fetal contribution. Clarification of the mechanisms underlying preterm preeclampsia may help to identify how congenital heart defects arise during embryogenesis [1-3].

Congenital heart diseases may be more common in newborns of women with preeclampsia. This underscores the need for fetal and newborn screening for congenital heart defects as part of the fetal and newborn surveillance studies in women with preeclampsia so as to improve their infant’s wellbeing [4-6].

Preeclampsia was significantly associated with noncritical heart defects in offspring, and preeclampsia with onset before 34 weeks was associated with critical heart defects. However, the absolute risk of congenital heart defects was low [7-9].

### Conclusion

The absolute prevalence of congenital heart defects was higher for infants of women with preeclampsia than those without it.

Som it is important to do the screening fetal heart scan for the women who had preeclampsia and after birth Echo for their newborns [1,4,7].

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