

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20252768>

## Review Article

# Hypertensive disorders of pregnancy-pre-conception and inter-conception care

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**Received:** 28 August 2024

**Revised:** 10 June 2025

**Accepted:** 14 August 2025

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## ABSTRACT

Women with hypertensive disorders during pregnancy face short- term and long-term complications which can impact both maternal as well as neonatal health. It is still a leading cause of maternal mortality despite aggressive treatment methods available. In the present article, effort has been made to address the potential threats and how and when to take certain preventive steps to improve the overall health of the woman before and after conceiving. It focuses on prenatal counselling, goals, lifestyle modifications and anti-hypertensive treatment.

**Keyword:** Hypertensive disorder, Pre-conception care, Inter-conception care

## INTRODUCTION

Hypertensive disorders complicate 3-10% of all pregnancies and are one of the leading causes of maternal death.<sup>1</sup> Maternal mortality due to hypertensive disorders complicating pregnancy approximates to 5.5% whereas eclampsia alone contributes to 8-14% of the maternal deaths.<sup>2</sup> Due to the prevalence of the disease as well as the poor maternal and perinatal outcomes, preventive steps are needed before and after the pregnancy itself. Thus, the care of the mother starts in the pre-conceptional period itself. In this review, the focus is on pre-conception and inter-conception care as after the delivery of the baby there is an immediate need to continue care of the mother to optimize her health.

Hypertensive disorders are classified into various categories as depicted in Table 1. Also, there has been a

substantial rise in these hypertensive disorders due to an increase in obesity, unhealthy lifestyle and other comorbidities. To combat the increase in incidence and the exacerbations of hypertensive disorders in pregnancy, care should be started from the pre-conceptional period. Pre-conceptional, post-partum, inter-conceptional and well-women care are interrelated and are defined by the timing of pregnancy and delivery. Pre-conceptional care includes optimization of maternal health conditions, addressing modifiable risk factors, improving the maternal and fetal outcome and providing education about healthy pregnancy.

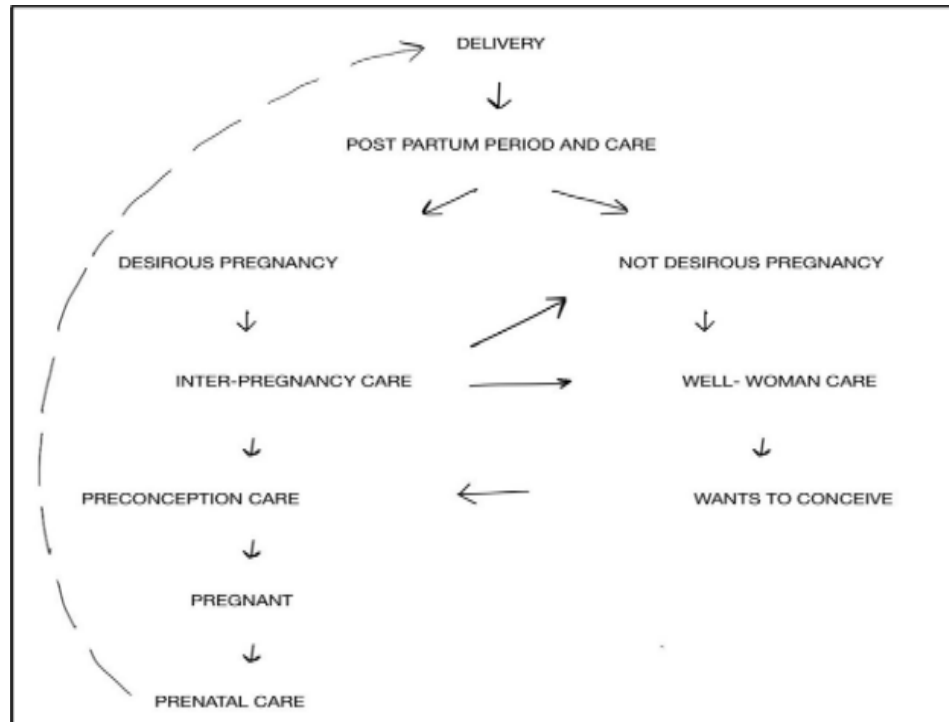
At pre-pregnancy visits health care professionals should take the opportunity to counsel women about a healthy lifestyle and minimize adverse risks. Pre-conceptional counselling begins while using contraception or planning for pregnancy.

**Table 1: American college of obstetricians and gynecologist's definitions of the hypertensive disorders.**

Hypertensive disorders	Definition
Hypertension in pregnancy	Systolic blood pressure $\geq 140$ mm Hg or diastolic BP $\geq 90$ mm Hg, or both, measured on two occasions at least 4 hours apart.

Continued.

Hypertensive disorders	Definition
<b>Severe-range hypertension</b>	Systolic blood pressure $\geq 160$ mm Hg or diastolic BP $\geq 110$ mm Hg, or both, measured on two occasions at least 4 hours apart
<b>Chronic hypertension</b>	Hypertension is diagnosed or present before pregnancy or before 20 weeks of gestation, or hypertension is diagnosed for the first time during pregnancy and that does not resolve in the postpartum period.
<b>Chronic hypertension with superimposed Pre-eclampsia</b>	Pre-eclampsia in a woman with a history of hypertension before pregnancy or before 20 weeks of gestation

Figure 1: Continuum of care.<sup>4</sup>

### PRE-CONCEPTIONAL CARE

Many chronic medical disorders like diabetes, hypertension, heart disease etc. have serious implications on maternal health as well as future pregnancy outcomes and thus should be optimally managed. It should include collaboration with maternal-fetal specialists and other departments. A multidisciplinary approach yields better outcomes.

Various components include: Reviewing personal medical and surgical history, psychiatric illness and chronic medical illness in the family. Reviewing prescription and non-prescription medications. Patients with chronic hypertension who are on ACE inhibitors and angiotensin receptor blockers should be counselled about the possibility of birth defects in the fetus like CVS malformation, renal dysfunction, oligohydramnios and fetal growth restriction.<sup>5</sup>

### Counselling

About the complications during and after pregnancy such as:

*Maternal risks like:* Eclampsia, placental abruption, pulmonary oedema, HELLP syndrome, acute respiratory distress syndrome, coagulopathy, renal failure, myocardial infarction, stroke, and retinal injury.

*Fetal risks:* Abnormal fetal testing, extreme prematurity, Doppler changes like persistent reversed end-diastolic flow in the umbilical artery, fetal death and stillbirth.

*Long-term complications:* Cardiovascular disease (hypertension, myocardial infarction, congestive heart failure), cerebrovascular accident, peripheral arterial disease, nephropathy, retinopathy, mortality.

*Lifestyle modifications:* Healthy diet, BMI between 18.5-24.9 kg/m.<sup>2</sup>

Exercise may reduce the risk of gestational hypertension and pre-eclampsia by 30 and 40% respectively.<sup>6</sup>

### Immunization

Check status of Tdap, measles, rubella, mumps, hepatitis b and varicella. After MMR and varicella vaccination, it is

safer to avoid pregnancy for 1 month. Those women who have not been immunized with Tdap should receive one dose of Tdap between 28-32 weeks of gestation to protect the neonate from Pertussis till 2 months of age.

Screening for sexually transmitted infections, HIV, hepatitis, and syphilis.

### Contraception

Patients should be counselled pre-conceptionally about various methods available for use. Those patients on ACE inhibitors and Angiotensin receptor blockers should be advised to not conceive while they are on medications or to change to a safer option before conception.

All reproductive age group women should be advised to take folic acid 400ug daily at least 1 month before conception.

Screen for intimate partner violence and counsel about the harmful effects of smoking, alcohol and substance abuse.

### INTER-CONCEPTIONAL CARE

Inter-conceptional care is defined as the health care needs of reproductive age group women who are between pregnancies to improve the outcome of the women and the infant. Table 2 suggests care during various stages of pregnancy.

In high-risk conditions like hypertensive disorders of pregnancy there are acute exacerbations and thus merit particular attention. As physiological changes of pregnancy revert to a non-pregnant state, blood pressure decreases within 48 hours of delivery but increases again 3-6 days post-partum. Thus, it is recommended to monitor BP for 7-10 days after delivery as mentioned in Table 3 and 4.

**Table 2: Key steps of inter-conceptional care.**

During prenatal care	During the maternity stay	At the comprehensive post-partum visit	During routine health care or well-women or pediatric visit
<b>Assign a health care professional to provide primary care in immediate post-partum.</b>	Discuss the time and location of follow-up for post-partum care	Review complications of hypertension and their implication on maternal health	Assess if a woman is likely to conceive next year
<b>Discuss about contraception</b>	Discuss about contraception	Ensure contraception	Screen for depression, mental health disorders and intimate partner violence
<b>Breastfeeding counselling</b>	Breastfeeding counselling	Establish breastfeeding	Screen for chronic conditions and optimise
<b>Counsel about long-term complications of hypertension</b>		Counsel about long-term complications of hypertension	Pediatric colleagues to screen for maternal health

**Table 3: Chief clinical components of inter-conceptional care.**

Variables	Recommendations
<b>General</b>	Anticipatory guidance during pregnancy and post-partum care plan Achieve pre-pregnancy weight by 6-12 months post-partum (BMI-18.5-24.9 kg/m <sup>2</sup> ) Adequate nutrition Smoking cessation, avoiding the use of alcohol and drugs Screen for intimate partner violence Screen for STDs If planning for pregnancy-start folic acid 400ug Review prescription
<b>Breastfeeding</b>	Establish Longer duration is associated with a low risk of hypertension, diabetes, and metabolic syndrome.
<b>Inter pregnancy interval</b>	Avoid intervals < 6 months and explain about risks and benefits of repeat pregnancy within 18 months.
<b>Depression</b>	Screen, counsel and treat
<b>Contraception</b>	For adequately controlled BP- -MEC 1- Progesterone-only pills, IUCD (LNG, CuT) -MEC 2- DMPA -MEC 3- Pill, Patch, ring, injectable

**Table 4: Specific recommendations in such conditions.<sup>7</sup>**

Condition	Counselling	Inter-pregnancy test	Goals	Medication of concern
<b>Gestational hypertension</b>	Increased risk of chronic hypertension (3%), Pre-eclampsia (7%) Recurrence (11%). Cardiovascular disease (1.5-3 times)	Evaluate BP for resolution of hypertension as well as the presence of end-organ damage.	BP<140/90 mmHg Maintain healthy weight Discuss about aspirin for future pregnancy	Ace inhibitor, angiotensin receptor blocker
<b>Pre-eclampsia</b>	Increased risk of Recurrence (16-23%), Chronic hypertension (2%) and gestational hypertension (6-12%). Cardiovascular disease (1.5-3 times) Stroke (2-3 times)	Evaluate BP for resolution of hypertension as well as the presence of end-organ damage.	BP<140/90 mmHg Maintain healthy weight Discuss about aspirin for future pregnancy	Ace inhibitor, angiotensin receptor blocker
<b>Chronic hypertension</b>	Increased risk of Gestational hypertension (9%), Pre-eclampsia (14%). Maternal morbidity and mortality. Uncontrolled hypertension leading to end organ damage, renal disease and cardiovascular disease (1.7 times) Myocardial infarction and strokes (1.8 times)	Evaluate BP for resolution of hypertension as well as the presence of end-organ damage.	BP<140/90 mmHg Maintain healthy weight Discuss about aspirin for future pregnancy	Ace inhibitor, angiotensin receptor blocker

## DISCUSSION

The above article emphasizes on the importance of pre-conceptional and inter- conceptional care in hypertensive disorders of pregnancy. Any care starts with knowing the patient's history and appropriate counselling to avoid any potential health risks to her and her future pregnancy. Many articles and studies have been published regarding the care and our article summarizes the recommendations and intervention available. Patients should be counseled about all the possible complications as stated by various studies. Large cohort study from China emphasized the increased risks of adverse pregnancy outcomes including preterm birth, small for gestational age and perinatal death which can be diminished with longer durations of pre-conceptional health preparation.<sup>8</sup> Deng et al in their meta-analysis stated association of hypertension in before or in early pregnancy with complications during pregnancy.<sup>9</sup> Zhang et al also stated the same.<sup>10</sup> Another important factor apart from the medications is to modify diet. A RCT mentioned the use of DASH diet (dietary approaches to stop hypertension) pre-conceptionally to reduce the development of pre-eclampsia and metabolic outcomes.<sup>11</sup> Also, apart from calcium intake which is associated with a 21% lower risk of developing hypertensive disorders of pregnancy, patient should be advised vit D and folic acid as well.<sup>12</sup> As mentioned previously blood pressure should

be maintained below 140/90 mmHg along with healthy weight, smoking cessation and alcohol. Patients should also be screened for intimate partner violence to have better mental health condition and reduce adverse outcomes.<sup>13</sup> Antihypertensives should be reviewed to reduce teratogenic effect on fetus.<sup>14</sup> Pre-conceptional and inter-conceptional care offers a vital window to address modifiable risk factors and optimize cardiovascular health between pregnancies to support long term health for both mother and child.<sup>15</sup>

## CONCLUSION

In conclusion, both pre-conceptional and inter-conceptional care play a vital role in managing hypertensive disorders in pregnancy. Addressing the risk factors, optimizing maternal health and providing education about the disease significantly improves maternal and fetal outcomes. These comprehensive care strategies help to provide a supportive environment for future pregnancies as well as reduce maternal and perinatal mortality.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** Mala YM, Aggarwal S. Hypertensive disorders of pregnancy-pre-conception and inter-conception care. *Int J Reprod Contracept Obstet Gynecol* 2025;14:3189-93.