

## A COMPARATIVE STUDY OF NORMAL PREGNANCY WITH HYPERTENSIVE PREGNANCY IN RELATION WITH SERUM TRIGLYCERIDE LEVEL AND MATERNAL FOETAL OUTCOME

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### Abstract

**Background:** Preeclampsia is a pregnancy is a specific condition characterized by hypertension and proteinuria that remits after delivery. Hypertensive disorders are a long standing threat that endangers the lives of both mother and child. It can manifest in four forms during pregnancy i.e., gestational hypertension, chronic hypertension, preeclampsia and eclampsia.

**Material and Methods:** This is a prospective comparative study, where data was collected from pregnant women, who were more than 28 weeks of gestation and met the inclusion criteria in Darbhanga medical college and Hospital, Darbhanga, Laheriasarai, Bihar. Comparison was done on blood pressure, triglyceride level, BMI, mode of delivery, maternal and foetal outcome among two groups ie hypertensive and normotensive.

**Conclusion:** Levels of serum triglyceride are significantly increased in hypertensive patients. The mean serum triglyceride levels also significantly increased with increase in severity of hypertension. Hence it is important to identify the serum triglyceride levels among hypertensive patients.

**KeyWords:** Serum triglyceride, pre eclampsia, Proteinuria.

### Introduction

The prevalence of preeclampsia is around 8-10% in India. Hypertensive disorders are amongst the top 3 causes for maternal deaths in India. Being a multisystem disorder, if not identified early, it not only impairs the functions of kidney and liver but also causes intense vasospasm, HELLP syndrome, postpartum vascular collapse, impaired electrolyte balance, blindness, etc., effecting almost every organ of the body. Women with pre-eclampsia are also more likely to suffer neonatal death or still birth. It might also effect the fetus by causing intrauterine death, intrauterine growth retardation and prematurity.

Pregnancy is a physiological process that is accompanied by various anatomical, physiological and biochemical changes of the entire body. During pregnancy total lipid levels increases by 50%. HDL, LDL and triglyceride levels also increase by 15%, 40% and 50% respectively. The etiology of pre-eclampsia is still unknown. Since the etiology and pathogenesis of hypertensive disorders in pregnancy still remains controversial, many markers of endothelial dysfunction have been identified in preeclampsia women. Due to insulin resistance and increased estrogen during pregnancy, there is alteration of circulating triglycerides, fatty acids cholesterol and phospholipids due to metabolic changes in both the liver and adipose tissue. . As pregnancy continues, this causes hyperlipidemia consisting principally of increased triglycerides. Hypertriglyceridemia is one of the potent risk factor for metabolic syndrome. Hence altered lipid profile

like increased total cholesterol, low-density lipoprotein cholesterol, triglycerides and decreased high-density lipoprotein cholesterol concentrations are associated with an increased risk committed to achieve the SDG(Sustainable Development Goal) of reducing the MMR to less than 70 per lakh live births by the year 2030 from current 130.<sup>(8)</sup> Hypertensive disorders being one of the major cause for maternal deaths in India, it becomes essential to identify them and interfere at earliest to curtail untoward perinatal outcomes. Though many studies have shown that hypertriglyceridemia precedes the onset of preeclampsia, the role of triglyceride levels is hardly established. Hence the current study was undertaken with an aim to show the co- relation between triglyceride levels and the maternal and fetal outcome. of preeclampsia.

### Objectives

To compare the observed serum triglyceride level in both groups. To correlate the observed serum triglyceride level with maternal and fetal outcome.

### Review of Literature

The cardio-vascular changes that occur in pregnancy are mainly to attain adequate foeto-placental circulation for the wellbeing of fetal growth and development. During pregnancy there is vasodilatation of systemic vasculature and the maternal kidneys. Cardiac output also increases by 45%, whereas the DBP and SBP decreases. On the contrary some studies also proved increase in blood pressure

throughout pregnancy. Whereas, another population based study showed an increased blood pressure during pregnancy among obese women only.

In short the cardiovascular system of pregnant women undergoes significant structural and hemodynamic changes. Apart from increase in cardiac output and a decrease in maternal systemic vascular resistance; it also effects the renin- angiotensin-aldosterone system and the heart and vasculature undergo remodeling. Any maladaptation of these factors has been associated with fetal morbidity. Therefore understanding the normal cardiovascular changes in pregnancy is essential for the better outcome of pregnancy.

Gaillard R et al in their study followed up blood pressure of women throughout pregnancy and found that for women who developed pregnancy-induced hypertension and preeclampsia in later pregnancy, from first trimester onwards only systolic blood pressure, diastolic blood pressure, and mean arterial pressure were higher. Though there was no significant variation of blood pressure from first to second trimester, there was significant increase in systolic and diastolic blood pressure from second to third trimester and the findings are associated with the risk of gestational hypertensive disorders. Study stated that blood pressure tracking is related to maternal characteristics and further research is needed to intrigue on factors influencing blood pressure and their associations with gestational hypertensive disorders. During pregnancy women's metabolism adapts various changes to ensure adequate supply of nutrients to the growing foetus. During early pregnancy the glucose levels in plasma, insulin and hepatic gluconeogenesis are unaltered but in later periods mother manifests hypoglycemia and insulin resistance. This results in increased transfer of glucose through placenta. Proteins are building blocks of human body and they are needed in required amounts during pregnancy Lipoprotein levels in pregnancy has important implications for the developing fetus and newborn. Cholesterol is most important for the normal development of fetus and dyslipidemia is linked to adverse perinatal outcomes.

### Material and Methods

A prospective comparative study was done, Total 150 cases and 150 control, department of Obs and Gynae at, Darbhanga medical college and Hospital, Laheriasarai,

Bihar. duration on two years. where data was collected from pregnant women, who were more than 28 weeks of gestation and met the inclusion criteria. Preliminary information regarding the participants was collected after obtaining informed consent by using a questionnaire and the blood samples were collected for the estimation of triglyceride levels. The participant was contacted personally in hospital after delivery to know the outcome of pregnancy.

**Statistical analysis:** Data will be analyzed by percentage, chi-square test, unpaired Ttest Antenatal women attending the above hospitals with more than 28 weeks of gestational period, fulfilling the following

### Inclusion criteria:

Age 20-35 years  
Antenatal normotensive pregnant women beyond 28 weeks of gestation  
Antenatal women with hypertensive disorders complicating pregnancy beyond 28 weeks of gestation

**Exclusion criteria:** Diabetes in pregnancy, Chronic hypertension Liver disorders, Renal disorders, Thyroid disorders

The triglyceride levels of the patients have been obtained from reports of Department of biochemistry DMCH Hospital Lab, where the patients sample was submitted for estimation. **Sample size** Considering the proportion of pregnant women with gestational hypertension in India as 7.8% based on the previous study,(29) at absolute error of 3% and 5% level of significance, the estimated sample size is 307.

### Results

Age distribution among hypertensive subjects varied from 18 years to 34 years. Most of the participants in this group were of 25 years. The mean age was 24.5 years with a standard deviation of 3.89 years. Age distribution among normotensive subjects varied from 18 years to 34 years. Most of the participants in this group were of 22 years. The mean age was 23.3 years with a standard deviation of 3.59 years. There was no significant difference in the mean age of both the groups, hence both the groups were comparable in terms of age. (Table 1)

**Age distribution among hypertensive and normotensives**

| Variable  | Hypertensive | Normotensive | t-value | p-value |
|-----------|--------------|--------------|---------|---------|
| Minimum   | 18           | 18           | 2.710   | 0.007   |
| Maximum   | 34           | 34           |         |         |
| Mode      | 25           | 22           |         |         |
| Mean , SD | 24.5, 3.89   | 23.3, 3.59   |         |         |

Significant if  $p < 0.05$

There was no statistically significant difference between both the groups with respect gravida status; therefore the two groups were similar in terms of their obstetric status.

#### Distribution of obstetric status among hypertensive and normotensive patients

| Variable        | Hypertensives | Normotensive | t-value | p-value |
|-----------------|---------------|--------------|---------|---------|
| Primigravida    | 78            | 73           | 0.063   | 0.950   |
| Multigravida    | 72            | 77           |         |         |
| Range (Gravida) | 1-6           | 1-5          |         |         |
| Mean, SD        | 1.73, 0.982   | 1.72, 0.836  |         |         |

Gestational age among hypertensive patients varied from 28 weeks to 41 weeks. Most of the participants were of 40 weeks of gestation. The mean gestational age in the group was 37.53 weeks with a standard deviation of 2.9 weeks. The gestational age among normotensives varied from 30 weeks to 42 weeks. Most of the participants were of 39 weeks of gestation. The mean gestational age in the group was 38.56 weeks with a standard deviation of 1.7 weeks. The birth weight among normotensive subjects

varied from 1 kg to 3.9 kg. The mean birth weight was 2.47 in the group with a standard deviation of 0.66 kg. 83.3% of the babies were of normal weight, whereas 15.3% were low birth weight weighing less than 2.5 kg but more than 1.5 kg and 1.4% were very low birth weight that is less than 1.5 kg. The mean birth weight of the newborns of hypertensive subjects was higher as compared to normotensive and the difference was statistically significant. Distribution of birth weight among two groups.

| Birth weight | Hypertensive (kg) | Normotensive (kg) | t-value | p-value |
|--------------|-------------------|-------------------|---------|---------|
| Minimum      | 1                 | 1                 | -4.07   | 0.000   |
| Maximum      | 3.7               | 3.9               |         |         |
| Mean, SD     | 2.74, 0.45        | 2.47, 0.66        |         |         |

In the hypertensive group 68.7% of the newborns had no complications. 31.3% of the babies were admitted to NICU as a result various complications amongst which 10% died within first 2 weeks of postnatal period.

In the normotensive group 94.7% of the newborns had no complications. 5.3% of the babies were admitted to NICU as a result various complications amongst which 2.7% died within first 2 weeks of postnatal period. Among the normotensive subjects the mean APGAR score was 6.23 at 1 minute with a standard deviation of 0.85 and at 5 minutes the mean APGAR score was 7.43 with a standard deviation of 0.71.

#### Discussion

Hypertensive disorders are a long standing threat that endangers the lives of both mother and child. 50-98% of these maternal deaths that occur in India are due to direct obstetric complications which also include hypertensive disorders.

In the current study, none of the participant belonged to teenage pregnancy. According to WHO, each year around 21 million girls aged 15 to 19 years and 2 million girls aged under 15 years become pregnant in developing regions. Most of these pregnancies are either unplanned or unwanted. Adolescent pregnancy causes ill health and poverty and endangers the life of both mother and child. Globally, complications associated with adolescent

pregnancy are one of the leading causes in low and middle-income countries accounting for 99% of global maternal deaths of women ages 15 to 49 years. Some of the complications associated with adolescent pregnancy are eclampsia, puerperal endometritis, and systemic infections than women aged 20 to 24 years. Moreover the psychological, emotional and social needs of pregnant adolescent girls are greater than those of other women. On the other hand pregnancy over 35 years old, are also associated with increased risks. Older pregnant women demand more information and have anxiety related to the outcome of their pregnancy. Therefore it is important for healthcare providers to be aware of the different complications associated with older pregnant women in order to meet their individual needs within the maternity services.

The serum triglyceride levels depend on age of the women. It generally increases as the women ages. In the current study there was no significant difference in the mean age among hypertensive and normotensive women. In the current study there was no difference in the obstetric status among both the groups. Hence both the groups were comparable in terms of their obstetric status. In both the groups the number of primigravida and multigravida were almost equal. The obstetric index varied from gravida 1 to gravida 6 in hypertensive subjects and gravida 1 to gravida 5 in normotensive subjects. Another study done by Al-Shaikh G *et al.*, found that history of miscarriage is

significantly higher in grandmultipara as compared to nulliparous women. Caesarean delivery was also elevated significantly higher in the grandmultipara as compared to nulliparous women. Gestational age at birth is associated with both fetal and neonatal deaths, postnatal death and morbidities such as the respiratory distress syndrome and necrotizing enterocolitis. Some of the long-term morbidities such as deafness, blindness, hydrocephaly, mental retardation, and cerebral palsy are also manifested. Preterm birth is defined as birth before 37 completed weeks of gestation. An estimated 15 million infants are born preterm, with resulting complications. It causes around one million neonatal deaths annually and also a significant number of childhood morbidities. Hypertensive disorders in pregnancy are one of the major cause of maternal and prenatal morbidity and mortality. Another study done by Umesawa M et al has found that the prevalence of HDP, gestational hypertension and preeclampsia are 5.2–8.2%, 1.8–4.4% and 0.2–9.2%, respectively. The factors that increase the risk of gestational hypertension can be genetic or non-genetic. Some of the factors such as body mass index, anemia and illiteracy are the important modifiable risk factors. Whereas some other factors like maternal age, primiparous, multiple pregnancy, HDP in previous pregnancy, gestational diabetes mellitus, preexisting hypertension, preexisting type 2 diabetes mellitus, preexisting urinary tract infection and a family history of hypertension, type 2 diabetes mellitus and preeclampsia are nonmodifiable risk factors. Lipoprotein levels in pregnancy have important implications for the developing fetus and newborn. Cholesterol is most important for the normal development of fetus and dyslipidemia is linked to adverse perinatal outcomes. Dyslipidemia also has associations with the hypertensive disorders of pregnancy and gestational diabetes. In the hypertensive group 68.7% of the newborns had no complications. 31.3% of the babies were admitted to NICU as a result various complications amongst which 10% died within first 2 weeks of postnatal period. In the normotensive group 94.7% of the newborns had no complications. 5.3% of the babies were admitted to NICU as a result various complications amongst which 2.7% died within first 2 weeks of postnatal period. The frequency of complications was higher among newborns of hypertensive subjects and the difference of distribution among both groups was statistically significant.

### Conclusion

The serum triglyceride levels is one of the important indicator of maternal and fetal health status of a pregnant women. The levels of serum triglyceride are significantly increased in hypertensive patients. The mean serum triglyceride levels also significantly increased with increase in severity of hypertension. Hypertension in pregnancy per se is associated with varied maternal and fetal complication.

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