

## TRIPLE TEST AND PREGNANCY OUTCOME ASSOCIATION

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### ABSTRACT

*Pregnancy complications are bothersome entities leading to maternal and neonatal mortality. These complications may be prevented with recognition of at risk population including diabetic or hypertensive women and low birth weight and premature newborns. However, there is no definite laboratory method. Hence in this study the association of triple test results with pregnancy outcomes in mothers and newborns were evaluated. Current study was performed as prospective cohort. One-hundred and six pregnant women with gestational ages from 16<sup>th</sup> to 20<sup>th</sup> weeks attending to a training hospital in Tehran, Iran since January 2010 to January 2012 were recruited. In this study four newborns (3.8%) were preterm and one newborn (0.9%) died. Two cases of preeclampsia (1.9%), four cases of LBW (3.8%), one case of placental abruption (0.9%), and six cases of premature rupture of membranes (5.7%) were seen. There was no significant association between triple test results and pregnancy complications in mothers and newborns ( $P > 0.05$ ). As a result it may be concluded that triple test has no obvious statistically significant association with pregnancy outcomes and complications.*

**Keywords:** *Complication, Maternal, Neonatal, Pregnancy, Triple Test.*

### INTRODUCTION

Congenital anomalies are a major and preventable cause of prenatal diseases (Dolke et al., 2010; Garne et al., 2005). These anomalies may be diagnosed before the birth with imaging techniques and other some other screening methods and subsequently the birth of a neonate with anomalies may be prevented by abortion (Boyd et al., 2008; Garne et al., 2010; Wyldes & Tonks, 2007).

Among the most common tests used as a standard method for diagnosis of these anomalies, are triple and quadruple tests (Reynolds, 2010). Triple test include measurement of serum level of alpha-fetoprotein (AFP), esteriol, and human chorionic gonadotropin (beta-HCG) of mother and quadruple test would have additionally the serum level of inhibin A (Harrison & Goldie, 2006; Reynolds, 2010). These tests if are disordered, some chromosomal abnormalities specifically Down's syndrome should be suspected and additional test including chorionic villus sampling (CVS) and karyotyping should be performed (Breathnach et al., 2007; Malone et al., 2005). However these tests have a known association with congenital anomalies and substantially may be used for detection of such disorders, the association of these tests with pregnancy complications is controversial (Gagnon et al., 2008). Hence in this study the association of triple test results with pregnancy outcomes in mothers and newborns were evaluated.

## MATERIALS AND METHODS

Current study was performed as a prospective cohort. One-hundred and six consecutive pregnant women with gestational ages from 16<sup>th</sup> to 20<sup>th</sup> weeks attending to a training hospital in Tehran, Iran since January 2010 to January 2012 were recruited. Data collection was performed by a checklist.

The inclusion criterion was pregnancy and exclusion criteria included history of congenital anomalies in mother and father, maternal body mass index of more than 30 or less than 20 kg/m<sup>2</sup>, multiple pregnancies, coronary artery disease, current vaginal bleeding, current steroid-therapy, hyperthyroidism, hypothyroidism, and chronic hypertension.

The main objective was to determine the association of triple test results with pregnancy outcomes in mothers and newborns and the minor objectives included to determine the association of AFP, beta-HCG, esteriol, and inhibin level with maternal characteristics such as age, gravid, parity, and hypertension, and also with neonatal factors including gestational age and birth weight. After data collection was completed, the statistical analysis of data was performed using SPSS version 13.0 software. The used methods included Exact-Fisher, ANOVA, Independent-Sample Student-T, and Chi-Square tests. The significance level was considered 0.05

## RESULTS

Eight mothers (7.5%) were aged between 36 and 44 years, 74 mothers (69.8%) between 26 and 35 years, and 24 cases (22.6%) between 15 and 25 years. Sixty mothers (56.6%) were primigravid, 34 subjects (32.1%) were second gravid, eight mothers (7.5%) were third gravid, and four mothers (3.8%) were fourth gravid. Sixty mothers (56.6%) were nulliparous and without live child. Eighty-six subjects (86.4%) had no history of abortion. The mean maternal BMI was 25.56 kg/m<sup>2</sup>.

Four cases of preterm labor (3.8%), one case of neonatal death (0.9%), two mothers (1.9%) with preeclampsia, four cases of LBW (3.8%), one mother (0.09%) with placental abruption, and six cases (5.7%) of premature rupture of membranes (PROM), were seen. Totally six mothers (5.7%) had positive triple test. AFP and inhibin A levels were abnormal in five patients (4.7%) and beta-HCG and esteriol were abnormal in six cases (5.7%). The mean values of four related factors are shown in Table 1. There were no cases of congenital anomalies. There was a statistically significant association between parity and esteriol level and abnormal levels were mostly seen in noliiparous women ( $P < 0.05$ ). Also there was a statistically significant association between parity and gravid with AFP level and higher levels were seen in women with gravid four and parity two ( $P < 0.05$ ).

**Table 1. The mean amount of beta-HCG, AFP, Esteriol, and inhibin A**

<i>Factor</i>	<i>Mean</i>	<i>Standard Deviation</i>
<i>AFP</i>	29.03	12.72
<i>Beta-HCG</i>	4288.84	1517.46
<i>Esteriol</i>	4.52	3.58
<i>Inhibin</i>	162.33	81.17

## DISCUSSION

The triple test was first introduced in 1988 and rapidly entered routine use as a screening test for Down syndrome (Dawson et al., 1993). In this study there was no significant association between preeclampsia, death, placental abruption, and preterm labor with results of triple test. Also there was no association between preeclampsia, death, placental abruption, and preterm labor with serum level of esteriol, AFP, inhibin, and beta-HCG. These four factors had no association with maternal BMI and gravid, and parity and also birth weight and gestational age. The gravid and parity had significant association and with increasing the age, the gravid and parity were increased. But the abortion and BMI had no correlation with age. There was a significant association between serum level of beta-HCG and esteriol with maternal age and the higher amount of beta-HCG was in those aged between 36 and 44 years and the higher amount of esteriol was in those mothers aged between 15 and 25 years. But the age was not related with AFP and inhibin A. There was no association between age with gestational age, GDM, preeclampsia, birth weight, placental abruption, death, and amount of beta-HCG, AFP, Esteriol, and inhibin A. The BMI was not related to amount of beta-HCG, AFP, Esteriol, and inhibin A. Also the BMI was not correlated to gravid, parity, abortion, GDM, preeclampsia, placental abruption, birth weight, death and gestational age.

The abortion was not related to preeclampsia, placental abruption, PROM, gestational age, and birth weight. Amount of beta-HCG, AFP, Esteriol, and inhibin A were not related with GDM, preeclampsia, placental abruption, PROM, gestational age, and birth weight. Placental abruption, PROM, and death were significantly more seen in LBW neonates. GDM had no association with birth weight, gestational age, death, preeclampsia, placental abruption, and PROM. Preeclampsia had no association with birth weight, gestational age, death, placental abruption, and PROM. According to our results, there is no obvious significant association between results of triple test and maternal and fetal complications. Also, there was no association between amount of beta-HCG, AFP, Esteriol, and inhibin A with maternal and fetal complications. However amount of these factors was significantly higher in mothers with age of more than 36 years.

Wortelboer et al. (2008) evaluated 30290 pregnant women in Netherlands and similarly showed no association between triple test and pregnancy complications. Anfuso et al. (2007) from Italy evaluated 16747 pregnant women and showed a significant association between AFP level and pregnancy complications especially low birth weight. Sayin et al. (2008) from Turkey in evaluated 749 women and showed that serum level of esteriol, AFP, Inhibin, and beta-HCG were related with pregnancy complications and women with higher level of these factors were more probable to develop oligohydramnios or have neonates with abnormal weight.

The triple test is becoming irrelevant as a diagnostic test because other variants on the test have been mandated to reduce the number of diagnostic tests required and to further decrease the iatrogenic risk to unaffected pregnancies. According to our findings, it may be concluded that triple test has no statistically significant obvious association with pregnancy complications. Multiple maternal serum screening factors should not be used at present as a screening method for adverse pregnancy outcomes outside an research protocol, as sensitivity is low, false positive rates are high, and no management protocol has been shown to clearly improve outcomes (Gagnon et al., 2008). Finally, it is recommended to perform further studies with larger sample volumes to grant the obtained results in this study.

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