

## Increased oxidative stress in Nigerian women with pre-eclampsia



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**To the Editor:** The precise causation of pre-eclampsia is still unknown, but oxidative stress in pre-eclampsia is well documented.<sup>1-6</sup> In pre-eclampsia, antioxidant capacity has been shown to be decreased in the placenta<sup>4</sup> and serum.<sup>5,6</sup> However, some workers have questioned the role of oxidative stress and lipid peroxidation in pre-eclampsia.<sup>7,8</sup> Furthermore, two randomised controlled trials of antioxidant supplementation during pregnancy with vitamin C and E showed no prophylactic or protective effect on the incidence of pre-eclampsia.<sup>9,10</sup>

We determined the total antioxidant status (TAS) of 580 pregnant women in Ibadan, south-western Nigeria, at booking and compared it with levels at the end of pregnancy. These women were not on any multivitamin preparations. Of the cohort, 29 developed pre-eclampsia. We further sampled 25 women who delivered without hypertension, 21 women at postnatal visits, and 25 age-matched non-pregnant women. Most of the women were aged 25 - 30 years and most had tertiary education. The incidence of hypertension in the study was 19% and that of pre-eclampsia 5%. The mean decrease in TAS between booking and delivery was 19% in the women who did not develop hypertension in pregnancy, and 35% in the women who developed pre-eclampsia.

We found that there were significant decreases in TAS compared with the mean at booking in both the women who developed pre-eclampsia and those who delivered without hypertension. There was, however, no significant difference when mean TAS at booking was compared with the mean in women who delivered with or without hypertension, the mean measured at postnatal visits, and

the mean in the non-pregnant women. Apart from the patients who developed pre-eclampsia, blood pressure was more or less stable throughout the period of pregnancy.

Our study supports the role of increased oxidative stress in women who developed pre-eclampsia in the course of pregnancy in Ibadan. The mean TAS in women who developed pre-eclampsia was significantly lower than the mean at booking and in non-pregnant women. Twenty-nine of our 580 subjects (5%) developed the disease, in keeping with the worldwide incidence of 5 - 7% reported by Mutter and Karumanchi in 2008.<sup>11</sup>

Oxidative stress has been demonstrated in uncomplicated pregnancy,<sup>12,13</sup> and this probably explains why there was a significant difference between TAS at booking and that at delivery in the women who did not develop hypertension during pregnancy. Pregnancy is characterised by dynamic changes in multiple body systems, resulting in increased basal oxygen consumption. Because it is mitochondria and iron rich, the placenta favours oxidative stress by production of reactive oxygen species (ROS). Consequently, mechanisms protecting against free radical generation and damage increase throughout pregnancy.<sup>11</sup> Our study also supports the theory that the placenta is the primary site of pre-eclampsia induction, i.e. the site of free radical generation, because when measured postnatally TAS levels had risen and were close to the levels at booking.

This is the first study of this magnitude in Nigeria demonstrating oxidative stress in normal pregnancy as well as in women who develop pre-eclampsia. It supports

the growing body of evidence that increased oxidative stress is involved in the pathogenesis of pre-eclampsia.

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