ABSTRACT

NUTRITIONAL DETERMINANTS OF FOETAL AND PLACENTAL GROWTH

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This study examined how maternal nutritional status affected foetal-placental growth and birth outcome. The relationship of maternal anthropometry and birth outcome has been described; few studies have examined the associations of maternal anthropometry and foetal biometry, but no studies have examined the relationship of maternal anthropometry and serial placental volume in the first half of pregnancy and examined the effects on birth outcome. Studies have described smaller birth size and the development of cardiovascular disease in adult life. The study provided the opportunity to examine the rate of growth of foetal and placental volume of foetuses carried by women who were in the lowest quartile for weight compared to the rest of the population and to determine when in utero, different rates of growth occurred.

This was a prospective study of 531 women who attended the antenatal clinic at the University Hospital of the West Indies and anthropometry, blood pressure and urinanalysis were done at booking. These were repeated together with foetal ultrasonography on six other occasions during their pregnancy. Hematology was performed at booking, 25 and 35 weeks gestation.
The main outcome measures were biparietal diameter, head and abdominal circumference and femur length at 14, 17, 20, 25, 30, and 35 weeks gestation; placental volumes at 14, 17, and 20 weeks gestation; birth weight, crown-heel and crown-rump length, head, chest, abdominal, mid-upper-arm circumference and placental weight.

The results showed that mothers who weighed less at booking and had lower weights throughout their pregnancy had newborns who had lower birth weights, shorter crown-heel length, smaller head, mid-upper-arm, chest and abdominal circumferences, smaller placental volumes at 17 and 20 weeks gestation and had lighter placentas. Women who gained weight more slowly in pregnancy had smaller babies. Similar associations were seen with body mass index and triceps skinfold thickness. There were no relationships between booking hemoglobin and birth outcome.

The effects of maternal anthropometry on foetal growth at different gestational ages was only apparent after 25 weeks gestation. Prior to this gestational age no significant associations were seen.

In conclusion, maternal nutritional status does have an effect on foetal and placental growth and birth outcome. Differences in rates of growth were detected between fourteen and eighteenth weeks gestation.

Keyword: Birth weight, maternal nutrition, placental volume, foetal growth.