SUMMARY

Background: Pregnancy is a physiological process associated with series of cardiovascular and haemodynamic adaptations that have significant effects on the heart. These adaptations may mimic heart disease in apparently normal hearts, precipitate or aggravate pre-existing heart disease or even cause heart disease in a susceptible heart. Globally, published studies on the effects of haemodynamic changes of pregnancy on the heart are few. Fewer still, are the numbers of published studies in the black population despite several data showing higher prevalence of pregnancy-related cardiovascular deaths in blacks and the available studies have shown inconsistent results. The inconsistencies probably result from the small sample size, racial differences in study populations and the differences in the reproductive age range in different populations.

Aim: This study assessed the cardiac structure and function of normal Nigerian pregnant women using echocardiographic and electrocardiographic parameters as well as the fasting serum lipid profile and discussed the implication of any differences.

Methodology: This cross-sectional comparative study compared the electrocardiographic and echocardiographic parameters as well as the fasting serum lipid profile of 96 consecutive normal Nigerian pregnant women in all trimesters of pregnancy between the ages of 18-45 years attending antenatal clinic in LAUTECH teaching Hospital, Ogbomoso with age – and sex – matched controls. Pregnant women with established cardiovascular risks or pregnancy complications were excluded. The control participants were selected from the members of staff and undergraduates of various departments of the Ladoke Akintola University of Technology and the member of staff of LAUTECH Teaching Hospital (LTH). Pregnant women and controls who satisfied the inclusion
criteria and gave informed verbal and written consent were serially recruited for the study until the sample size was met.

**Results:** The cardiac output was significantly higher in pregnancy (6.03 ± 1.3 vs. 4.32 ± 1.1 L/min, p< 0.001) with a progressive pattern of increase from the first trimester and peaking in the third trimester. The maximum increase was observed in the third trimester with about 38.9% increase in cardiac output contributed by 16.2% increase in heart rate and 22.6% increase in stroke volume. There is a lower systemic vascular resistance (1106.5 ± 267.5 vs. 1462.7 ± 304.7 dyne x sec/cm³, p<0.001) and mean arterial pressure (83.7 ± 9.9 vs. 90.0 ± 8.8 mmHg, p=0.001) during pregnancy. The ejection fraction was also higher (65.1 ± 7.3 vs. 61.4 ± 10.1%, p=0.015) and increased progressively while the mitral E/A ratio did not change significantly (1.59 ± 0.35 vs. 1.61 ± 0.21 p=0.663) during pregnancy. There was also a higher left ventricular mass index in pregnant women (96.6 ± 13.8 vs. 83.4 ± 13.8g/m², p<0.001). The cardiac axis decreases as the gestation age increases. No significant change in the QTc (399.5 ± 54.1 vs. 396.0 ± 30.1 ms, p=0.672) but the PR interval was significantly lower (151.9 ± 23.8 vs. 163.9 ± 25.6 ms, p= 0.006) compared with non-pregnant women but all values were within normal limit. There was a higher Total cholesterol (6.26 ± 1.44 vs. 4.44 ± 1.01mmol/L, p= 0.001), LDL-c (4.54 ± 1.40 vs. 3.21 ± 0.87 mmol/L, p= 0.010) and triglycerides (1.26 ± 0.47 vs. 0.52 ± 0.27mmol/L, p<0.001) in pregnant women compared with controls.

**Conclusion:** This study demonstrated that certain cardiovascular risk assessment parameters are altered by the physiological state of pregnancy and in addition many of these changes are dependent on individual maternal pre-pregnancy condition, parity and gestational age. Therefore caution should be exercised in carrying out these assessments and in interpreting results of these parameters obtained during pregnancy.