## Abstract

Low birth weight (LBW) baby is defined as a newborn with a birth weight less than 2500g. A low birth weight newborn can be identified as belonging to one of the categories, Small for Gestational Age baby (SGA) and/or a Pre Term Baby. SGA has been identified as being present, if the birth weight of the newborn is less than the $10^{th}$ centile of the expected weight for the particular gestational age. The leading cause of LBW in developing countries has been identified as SGA where as that in developed countries; it is mainly preterm births (PTB). The incidence of SGA is approximately 5-7% in developed countries while the comparable percentage is approximately 23 - 24% in developing countries. Symmetrical and asymmetrical patterns have been identified in SGA and the differentiation is done by using the Ponderal index.

SGA is associated with both short term and long term consequences. Therefore identification of the presence of SGA is important in reducing negative health consequences in the short term and in the long term. There are several methods to identify the SGA status in newborns and the method using the weight for gestational age curves is widely accepted. The country specific curves are more appropriate for such assessments, as they account for the population parameters, environmental conditions and genetic factors as relevant to that country.

In Sri Lanka, LBW rate has been static for past 2 decades irrespective of several intervention programmes. Due to the limited data on prevalence of SGA in the country, there are limitations in the identification of risk factors for SGA at the time. The present study was undertaken with the objective of developing weight-for-gestational-age-curves for newborns, to determine the incidence of LBW, SGA and PTB, identify risk factors and outcomes of the SGA babies.

The study was longitudinal in design and was carried out in 2 Medical Officer of Health areas in Colombo, in the year of 2010. A total of 1832 pregnant mothers were followed up from the day of registration with the national health system till their delivery. A sub sample of their babies was followed up for further 6 months. Relevant data for identification of risk factors for SGA were collected.

The key variables for the development of the curves, accurate period of gestation and correct birth weight were collected with sufficient accuracy by utilising several quality checks. As specified in the study protocol, selected data were used for the development of the curves. They were obtained from the newborns who did not have any complications / abnormalities at birth and whose mothers did not have any known maternal risk factors for LBW. Two curves were developed for male and female newborns. By using the developed curves, all newborns included in the study were identified as belonging to the two categories, SGA and non-SGA.

A nested case control study using SGA newborns and a sample of non SGA babies in the ratio of 1 SGA: 4 non SGA (randomly selected) was carried out. Univariate and multivariate analysis using logistic regression technique was used to identify risk factors. A sub sample of SGA and non-SGA babies were followed up and assessed at 6 months of age. Their pattern of survival, growth, development and morbidities were studied.

The present study observed a low birth weight rate of 14.7%, SGA rate of 18.6% (out of this, 72.1% were asymmetrical SGA) and preterm birth rate of 5.4%. The multivariate analysis revealed the following risk factors as significantly associated with the SGA: primi mothers (OR 2.47; 95% CI 1.45-4.21), mothers with high level of physical activity (OR 2.32; 95% CI 1.26-4.30) and those with low level of activity (OR 2.53; 95% CI 1.38-4.64) , body weight at the booking visit less than 38kg (OR 10.68; 95% CI 4.39-25.98), stress observed during the second trimester (OR 1.92; 95% CI 1.17-3.14), presence of pregnancy induced hypertension (OR 4.76; 95% CI 2.06-10.98), inadequate weight gain during pregnancy measured in relation to the pre-pregnant BMI (OR 2.61; 95% CI 1.57-4.35) and inadequate physical and psychological support received from the husband during the pregnancy ( as assessed by the mother) (OR 2.38; 95% CI 1.32-4.27).

The follow up study showed that the SGA babies had a significantly high mean weight gain (P=0.001) and length gain (P=0.012) at 6 months and early achievement of the milestone 'roll over' (P=0.004).

Most study findings were compatible with previous studies done in other countries as well as in Sri Lanka. There is evidence that SGA rates are increasing while the preterm delivery rates are reducing while maintaining the LBW at a relatively higher level.

Perusal of the risk factors identified, indicate the possibility of addressing many of them through the existing health care delivery system in Sri Lanka. However, it may be necessary to ensure improved quality of the existing services as well as make appropriate changes in the service delivery. This highlights the need for the policy makers and programme planners to consider approaches aimed at improving the quality of the services provided through the health sector.

Long term inputs related to the improvement of the nutritional status of the 'girl child' using a life cycle approach and other relevant inputs such as physical activity during pregnancy needs a planned programme involving multiple sectors. All such activities are likely to contribute to a reduction in the prevalence of SGA newborns.

**Keywords: Low birth weight, small for gestational age, preterm delivery, growth curves, catch-up growth**