

# Risk Factors and Short Term Morbidities Associated With Term-Small for Gestational Age Babies Delivered at Nepalgunj Medical College

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## ABSTRACT

**Introduction:** Small for gestational age (SGA) refers to birth weight of neonates less than 10<sup>th</sup> percentile for gestational age or 2<sup>nd</sup> standard deviation below the population norms on the growth charts. **Aims:** To identify common risk factors and common morbidities for small for gestational age babies. **Methods:** This is a cross sectional descriptive study and it has been conducted at Department of pediatrics, Nepalgunj Medical college which is a tertiary level teaching hospital located in western part of Nepal. All term small for gestational age neonates born during study period from January 2020 to December 2020 were included. Detailed baseline demographic and clinical profile has been collected and recorded in the predesigned Proforma. **Results:** The most common risk factors associated with small for gestational age babies in our study were maternal hypertension (14.6%) , maternal GDM(9.6%), Urinary Tract Infection (UTI) in 1<sup>st</sup> or 2<sup>nd</sup> trimester of pregnancy, maternal anemia, smoking, alcohol consumption, hypothyroidism and congenital heart disease. The most common short term complications associated with Small for gestational age babies were hypoglycemia and Meconium aspiration syndrome. **Conclusion:** The most common risk factors associated with Small for gestational age babies in our study were maternal hypertension, maternal Gestational diabetes Mellitus (GDM), Urinary Tract Infection in 1<sup>st</sup> or 2<sup>nd</sup> trimester of pregnancy, maternal anemia, smoking, alcohol consumption, hypothyroidism and congenital heart disease. The most common short term complications associated with Small for gestational age babies were hypoglycemia and Meconium aspiration syndrome (MAS).

**Keywords:** Hypoglycemia, Meconium aspiration syndrome , Small for gestational age

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## INTRODUCTION

Small for gestational age (SGA) refers to birth weight of neonates less than 10<sup>th</sup> percentile for gestational age or two SD below the population norms on the growth charts.<sup>1-4</sup>

In a study by Katz et al the prevalence of SGA ranged from 10.5% to 72.5%. Similarly prevalence of small-for-gestational-age (SGA) ranged from 12.0% to 78.4% in India.<sup>5</sup> Most small-for-gestational-age infants were born in India, Pakistan, Nigeria, and Bangladesh.<sup>6</sup> SGA can occur due to various known risk factors including the maternal, placental and fetal. Common maternal risk factors include maternal age TORCH infections, congenital HIV infection, and syphilis. Common placental risk factors include placental weight less than 350 gram, placental dysfunction secondary to pregnancy induced hypertension, pre-eclampsia.<sup>7-14</sup> SGA neonates can develop various complications/ co-morbidities. Short term complications include perinatal asphyxia, meconium

aspiration, persistent pulmonary hypertension, hypothermia, hypoglycemia, hyperglycemia, hypocalcaemia, polycythemia, jaundice; feeding difficulties and feed intolerance, necrotizing enterocolitis, late-onset sepsis and pulmonary hemorrhage. Longterm complications as stated by Barkers were type II diabetes, obesity, hypertension, coronary heart disease, dyslipidemia, insulin resistance syndrome, growth retardation (wasting and stunting), neurodevelopmental delay.<sup>15,16-19</sup> Our study is important as there is paucity of data in our part of Nepal for establishing direct and causal relationship of SGA babies with known common risk factors and their short term complications. Hence the study was conducted to identify common risk factors and common morbidities for SGA babies.

## METHODS

This is a cross sectional descriptive study and it has been conducted at Department of pediatrics, NGMC which is a tertiary level teaching hospital located in western part of

Nepal. All Term SGA neonates born during study period from January 2020 to December 2020 were included. Baby with gross congenital anomalies, out born babies, parent’s refusal and Newborn to mothers with unreliable gestational age excluded from study.

All newborns meeting the inclusion criteria were enrolled in the study and a written consent has been taken in local language. Detailed baseline demographic and clinical profile has been collected and recorded in the predesigned Proforma. The investigation was done as per NICU protocol and was noted. The complications that develop during hospital stay were noted. Outcomes like discharge or death were noted and all were entered in predesigned Proforma. All data were recorded and analyzed in Statistical package for Social science (SPSS) version 20.0 entered in Microsoft excel 2010.

**RESULTS**

There were total of 323 SGA neonates who met inclusion criteria and were enrolled in the study. Among the 323 neonates, most of the SGA babies were between 2000-2500 grams (73.1%), 18.6% babies were >2500grams but SGA and 8.4% of babies were below 2000 grams. Male and female ratio was found to be almost equal. Among 323 SGA neonates, 84.5% of mothers were between 20-30 years. Most of them were primigravida (56%) and most of them belonged to Upper caste ethnicity(51.3%). 39% of population belonged to lower middle class followed by upper lower class(22.9%) socioeconomic status. 34.9% of mother had education up to school level followed by diploma (31.2%). Most of them were homemaker (68.1%).

One fourth babies had no identifiable risk factors. Among the identifiable risk factors gestational hypertension, oligohydramnios, gestational diabetes mellitus, UTI were found to be common. This is depicted in table I.

| Risk factors  | No. of SGA baby<br>(n=323) | Percentage<br>(%) |
|---|----------------------------|-------------------|
| Gestational HTN   | 47                         | 14.6              |
| Oligohydramnios   | 47                         | 14.6              |
| Gestational DM  | 31                         | 9.6               |
| UTI (1 st and 2nd trimester)                                  | 31                         | 9.6               |
| Anemia  | 20                         | 6.2               |
| Smoking during pregnancy                                      | 18                         | 5.6               |
| Alcohol abuse   | 14                         | 4.3               |
| Hypothyroidism  | 10                         | 3.1               |
| Congenital Heart disease in mother                            | 9                          | 2.8               |
| Multiple pregnancy, HIV infection, h/o fever in 1st trimester | 11                         | 3.35              |
| No risk factors   | 80                         | 24.7              |

Table I: Association between maternal Risk factors SGA baby

**Common morbidities associated with SGA babies:** APGAR at 5 min: Among 323 neonates, 96% had normal APGAR

score at 5 min and 4% had APGAR score in between 4-7 who were diagnosed as perinatal depression. More than 2/3rd had no immediate morbidities. The common short term morbidity was hypoglycemia (13.3%), MAS (9.9%), neonatal hyperbilirubinemia (6.8%) and Sepsis 15(4.6%). This is depicted in table II.

| Variable SGA neonate | (n=323) | Percentage (%) |
|----------------------|---------|----------------|
| Hypoglycemia         | 43      | 13.3           |
| MAS                  | 32      | 9.9            |
| NNH                  | 22      | 6.8            |
| Sepsis               | 15      | 4.6            |
| Feeding difficulties | 10      | 3.1            |
| Perinatal asphyxia   | 8       | 2.5            |
| Hypothermia          | 7       | 2.2            |
| Polycythemia         | 1       | 0.3            |
| No complication      | 216     | 66.8           |
| Other complication   | 9       | 2.7            |

Table II: Associated co-morbidities

Other complications include Seizure, thrombocytopenia, congenital heart disease (ASD, VSD, PDA), TTNB, septic ileus, AKI, anemia.

**Short term morbidities and outcome associated with term SGA babies:**

Among 323 term SGA babies 33% had complications, of which 15.7% had 1 complication and 17.3% had multiple complications. All cases were discharged without any neurological impairment. Duration of stay were ≤3 days in 41.1% and more than 3 days in 51.1%. Duration of stay were 3 days in 51.1%. There were no deaths in the studied subjects and most of the babies were discharged within 3 days of admission.

**DISCUSSION**

We found 9.6% (31) of mother with SGA babies having GDM. GDM is usually associated with LGA babies. If the GDM mother develops vasculopathy it can lead to SGA. However study done in Nepal found that gestational Diabetes Mellitus caused IUGR in 12 (6.06%) cases.<sup>20</sup> One (9.6%) mother with SGA babies had UTI during 1<sup>st</sup> or 2<sup>nd</sup> trimester. Manandhar T and et al at College of Medical Sciences, Chitwan, in 2018 found that IUGR developed in 6(24%) cases with maternal UTI.<sup>21</sup> Only 20 (6.2%) mothers with SGA babies had anemia. Similarly Paudel G et al, found that prevalence of maternal anemia among SGA were 6.5% with AOR 1.29 (0.78 to 2.11), P= 0.321.<sup>22</sup>

Low hemoglobin levels may impair oxygen delivery to the body, creating an environment of oxidative stress or chronic hypoxia, which could then cause fetal growth restriction. 18 (5.6%) mother who were chronic smoker had SGA babies. As per Sun S and et al in U.S smoking during pregnancy causes 19.1 % term SGA babies in compared to 9.1 % in non-smokers.<sup>23</sup> Nicotine

induces the release of maternal catecholamines that reduce placental perfusion subsequently leading to SGA.

Also 14 (4.3%) had habit of regular alcohol intake of small to moderate amount, Maternal alcohol consumption during pregnancy has been associated with the disruption of metabolic pathways in the mother, thus impairing fetal development.<sup>23</sup> In the present study, other maternal risk factors contributing to SGA babies were observed and according to Shrestha et al hypothyroidism contributing to IUGR were 5%.<sup>20</sup> Mandhar et al found the other maternal risk factor causing IUGR were chronic renal disease, rheumatic disease, uterine anomaly, obstetric cholestasis, antiphospholipid antibodies(APLA) and chemotherapy.<sup>21</sup>

The 107(33.12%) babies suffered from some forms of neonatal complications. 1-2 complications were observed in 93 (28.79%) babies and > 2 complications in 14(4.3%). Most common short term complications were found to be hypoglycemia 43(13.3%). Lubencho et al<sup>24</sup>Hosagasi et al<sup>24</sup> and Jing Liu et al<sup>26</sup> found the probable cause of hypoglycemia in these SGA babies is due to metabolic disturbances related to glucose and fatty acid metabolism. Meconium aspiration syndrome 32(9.9%) was other important comorbidity following hypoglycemia. Etiology of the passing of meconium is unclear, but some theories exist on the passage of meconium is a response to fetal hypoxia.<sup>21</sup> Other complications were jaundice 22(6.%) cases, sepsis 15(4.6%) cases, feeding difficulties 10(3.1%) cases, perinatal asphyxia 8(2.5%) and hypothermia 7(2.2%) cases. 10(3%) had either Polycythemia, Seizure, thrombocytopenia, congenitalstay.<sup>27</sup> The probable reason for polycythemia, birth asphyxia, early meconium passage in SGA babies could be due to long-term intrauterine hypoxia due to placental dysfunction. There were no deaths in the studied subjects and most of the babies were discharged within three days of admission.

## LIMITATION

Multicentre study is needed for betterment SGA baby's outcome and follow up should be done late term complications.

## CONCLUSION

In summary the most common risk factors associated with SGA babies in our study were maternal hypertension, maternal GDM, UTI in 1st or 2nd trimester of pregnancy, maternal anemia, smoking, alcohol consumption, hypothyroidism and congenital heart disease. The most common short term complications associated with SGA babies were hypoglycemia and MAS.

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