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# EFFECTS OF SELECTED SOCIO-DEMOGRAPHIC, MATERNAL, SERVICE-RELATED AND PSYCHOLOGICAL RISK FACTORS FOR STILL BIRTHS DELIVERED IN DISTRICT GENERAL HOSPITAL, MATARA, SRI LANKA DURING 2015-2018

**Dr. Samaraweera Yasindu Nayana* & Dr. Patabendige ATND**

Regional Director of Health Services Office, Matara, Sri Lanka

***Keywords:***

*Still Births, risk factors, case control study.*

## *Abstract*

**Background and objectives:** Still births are a significant health problem in Sri Lanka. It is estimated that 6.1 still births per 1000 live births were reported in Sri Lanka in 2017. Almost half of stillbirths happen when the woman is in labour. The majority of stillbirths are preventable, evidenced by the regional variation across the world. This work was designed to find out effects of selected socio-demographic, maternal, service-related and psychological risk factors on still births.

**Materials and methods:** This is an unmatched case control study conducted in District General Hospital, Matara and included 884 study subjects (cases and controls 442 each).

**Results**: Exposure to kitchen smoke (OR:2.18, 95% CI:1.62-6.06), maternal age < 20 years (OR:3.18, 95% CI:2.72-5.65), BMI > 26 kg/m2 (OR:2.51, 95% CI:2.34-5.73), maternal hypertension(OR: 3.34, 95% CI:1.62 6.06 ) and maternal diabetes (OR: 2.58 , 95% CI:1.31 6.36)

**Conclusion**: Exposure to kitchen smoke, maternal age < 20 years, BMI > 26 kg/m2, maternal hypertension and maternal diabetes were risk factors for still births.

## Introduction

The definition for still birth recommended for international comparison is a baby born with no signs of life at or after 28 weeks' gestation. [1]. In 2015 there were 2.6 million stillbirths globally, with more than 7178 deaths a day [1]. The majority of these deaths occurred in developing countries. Ninety-eight percent (98%) occurred in low- and middle-income countries. About half of all stillbirths occur in the intrapartum period, representing the greatest time of risk. Estimated proportion of stillbirths that are intrapartum varies from 10% in developed regions to 59% in south Asia [1]. Still births are also a significant health problem in Sri Lanka.

It is estimated that 6.1 still births per 1000 live births were reported in Sri Lanka in 2017 [2]. Almost half of stillbirths happen when the woman is in labour [3].

The majority of stillbirths are preventable, evidenced by the regional variation across the world. The rates correlate with access to maternal healthcare. The Every New born Action Plan (ENAP) to end preventable deaths has a set stillbirth target of 12 per 1000 births or less by 2030. Global annual rate of reduction (ARR) needs to more than double the present ARR of 2% to accomplish this target for reduction in stillbirth [3].

By identifying modifiable risk factors, cost- effective interventions could be implemented by Sri Lanka to reduce preventable still births.

## Materials and Methods

We conducted an unmatched case control study in District General Hospital (DGH) Matara. Investigators visited post natal wards regularly to recruit eligible study subjects. First still birth was selected randomly and then all the eligible mothers who had still births were recruited until the desired size of cases achieved. Control mothers were selected in the same way until the desired sample size was achieved. Total sample size was 884 (No of cases and controls were 442 each).

### Inclusion and exclusion criteria

All still births and live births, delivered between 1st of January 2015 and 31st December 2018, irrespective of the mode of delivery, was screened for inclusion in the study. Inclusion criteria were still births (diagnosed by Medical Officer), exact POA (period of amenorrhoea) was known, mother was willing to participate in the study. Exclusion criteria were unknown gestational age and mothers who could not understand spoken

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Sinhalese. A control was a live birth which fulfilled above inclusion criteria was selected for every case.

Data about the maternal exposure to different risk factors in all cases and controls was recorded using a pretested questionnaire, Modified Life Events Inventory (MLEI) [5] and Data Record Sheet. Data collected consisted of maternal age, ethnicity, maternal educational level, maternal occupation, direct and indirect maternal exposures to cigarette smoke, exposure to kitchen smoke, parity, foetal congenital anomalies, foetal growth restrictions, drug intake other than routine Ante Natal supplements, previous abortions, Body Mass Index (BMI),physical trauma during pregnancy, maternal alcohol consumption during pregnancy, monthly family income per head, maternal hypertension(any time during pregnancy mother was detected as a hypertensive by a clinician), diabetes(any time during pregnancy mother was detected as a diabetic by a clinician)), post term pregnancy, prolonged labour and exposure to major life event during pregnancy[4]. This data was verified with the available records such as Ante Natal Cards of mothers to minimize the recall bias.
Questionnaires were administered by Investigators. Verbal informed consent was obtained from all the subjects (mothers) in Post Natal wards in standard manner. Data collection was terminated when desired sample size was achieved. The study protocol was approved by Ethics Review Committee of National Hospital, Colombo.

**Statistical analysis**
Stata 11.2 statistical software package [5] was used for analyzing data. Contingency table analysis was undertaken for bivariate analyses to determine odds ratios (OR) and 95% confidence intervals (95% CI) for maternal socio demographic factors and maternal risk factors associated with low birth weight. Multivariate logistic regression was conducted for adjusting confounding factors. Alpha (α) level < 0.05 was considered statistically significant. RoC curves were used to determine cut off points for parity, income, and exposure to major life event.

## Results

Distribution of risk factors among study subjects is shown in Table 1.

**Table 1** Maternal exposure to various risk factors in still births and controls

| *Maternal risk factor* | | *Still births* No (%) | *Live births* No(%) |
|---|---|---|---|
| Maternal age | < 20 years | 250(56.6) | 286(64.7) |
| | ≥ 20 years | 192(43.4) | 156(35.3) |
| Ethnicity | Sinhalese | 432(97.7) | 422(95.5) |
| | Non Sinhalese | 10(2.3) | 20(4.5) |
| Maternal education level | Grade 10 passed | 400(90.5) | 385(87.1) |
| | Grade 10 not passed | 42(9.5) | 57(12.9) |
| Maternal occupation | Occupied | 348(78.7) | 380(85.9) |
| | Not occupied | 94(21.3) | 62(14.1) |
| Maternal active smoking | Yes | 0(0) | 0(0) |
| | No | 442(100) | 442(100) |
| Exposure to passive smoking | Yes | 108(24.5) | 142(32) |
| | No | 334(74.5) | 300(68) |
| Parity | < 5 | 422(95.5) | 428(97) |
| | ≥ 5 | 20(4.5) | 14(3) |
| Foetal congenital anomalies | Yes | 52(11.8) | 22(4.8) |
| | No | 390(88.2) | 420(95.2) |
| Foetal growth restrictions | Yes | 16(3.6) | 22(5) |
| | No | 426(96.4) | 420(95) |
| Drug intake | Yes | 46(10.5) | 12(2.6) |
| | No | 396(89.5) | 430(97.4) |
| Previous abortions | Yes | 46(10.2) | 54(12) |
| | No | 396(89.8) | 388(88) |
| BMI | < 26 kg/m$^2$ | 387(87.6) | 396(89.6) |
| | ≥ 26 kg/m$^2$ | 55(12.4) | 46(10.4) |
| Physical trauma | Yes | 28(6.3) | 53(11.9) |

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|---|---|---|---|
| | No | 414(93.7) | 389(88.1) |
| | Yes | 0(0) | 0(0) |
| Alcohol consumption | No | 442(100) | 442(100) |
| | < Rs. 2875 | 86(19.5) | 75(16.9) |
| Monthly income per head | ≥ RS 2875 | 356(80.5) | 367(83.1) |
| | < 130mmHg | 176(39.5) | 306(69.2) |
| Maternal hypertension | ≥130 mmHg | 268(60.5) | 136(30.8) |
| | < 126 mg/dl(FBS) | 252(57.1) | 150(34.1) |
| Maternal diabetes | ≥126 mg/dl (FBS) | 190(42.9) | 292(65.9) |
| | Yes | 200(45) | 298(32.7) |
| Post term pregnancy | No | 242(55) | 144(67.3) |
| | Yes | 266(60.1) | 158(35.7) |
| Prolonged labour | No | 176(39.9) | 284(64.3) |
| | Yes | 54(12.2) | 49(11.1) |
| Exposure to major life event | No | 388(87.8) | 393(88.9) |

Results of univariate and multivariate logistic regressions are presented in Tables 2 and 3 respectively.

**Table 2** Results of univariate logistic regression

| Variables | OR | 95% CI | p value |
|---|---|---|---|
| Maternal age <20 years | 3.58 | 2.56 6.09 | 0.02 |
| Foetal growth restrictions | 2.89 | 1.98 4.34 | 0.01 |
| Maternal hypertension | 2.34 | 2.12 3.56 | 0.007 |
| Maternal diabetes | 1.58 | 1.34 4.98 | 0.04 |
| BMI ≥26kg/m$^2$ | 3.57 | 2.71 4.01 | 0.00 |
| Monthly income per head Rs .< 2875 | 1.08 | 1.02 6.77 | 0.04 |
| Exposure to kitchen smoke | 1.79 | 1.67 3.55 | 0.002 |
| Congenital anomalies | 5.41 | 4.67 6.79 | 0.03 |

OR= Odds Ratio

**Table 3** Results of multivariate logistic regression

| Variables | AOR | 95% CI | p value |
|---|---|---|---|
| Maternal age <20 years | 3.18 | 2.72 5.65 | 0.01 |
| *Foetal growth restrictions | 2.74 | 0.67 3.28 | 0.09 |
| Maternal hypertension | 3.34 | 1.62 6.06 | 0.002 |
| Maternal diabetes | 2.58 | 1.31 6.36 | 0.01 |
| BMI ≥26kg/m$^2$ | 2.51 | 2.34 5.73 | 0.00 |
| *Monthly income per head Rs .< 2875 | 1.23 | 0.83 4.87 | 0.06 |
| Exposure to kitchen smoke | 2.18 | 1.62 6.06 | 0.02 |
| *Congenital anomalies | 8.02 | 0.79 65.06 | 0.08 |

AOR= Adjusted Odds Ratio
* Not statistically significant

According to Table 3, maternal age < 20 years, maternal hypertension, maternal diabetes, BMI ≥ 26 kg/m$^2$ and exposure to kitchen smoke were risk factors for still births.

## Discussion

This study showed that maternal age < 20 years, maternal hypertension, maternal diabetes, BMI ≥ 26 kg/m$^2$were risk factors for still births.

Case Control Study conducted by Samaraweera and Abeysena [6] also showed BMI ≥ 26 kg/m$^2$ was a risk factor for still births. It may be said that maternal obesity would increase the risk of having still births.

Same study [6] also showed that exposure to kitchen smoke during pregnancy was a risk factor for adverse pregnancy outcomes. This was an important finding that pregnant mothers should use clean energy in preparing meals in the kitchen other than burning wood.

Teen pregnancies (maternal age <20 years) would increase the risk for still births according to previous studies [7, 8, 9]. Our study also confirmed that finding.

Maternal hypertension and diabetes were risk factors for still births in our study and this was consistent with several previous studies.

Higher BMI was a risk factor in our study. This finding was consistent with findings in studies by [10-15].

Our study did not show statistically significant association with still births and foetal growth restrictions and Congenital anomalies. This may be due to small sample size of this study.
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## Conclusion

Maternal age < 20 years, maternal hypertension, maternal diabetes, BMI ≥ 26 kg/m$^2$ and exposure to kitchen smoke were risk factors for still births in this study. Interventions such as health education, proper management of medical conditions such as maternal diabetes and hypertension, timely screening of pre pregnant mothers for medical conditions would decrease the incidence of preventable still births in Sri Lanka.

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