

## Abstract

**Background:** Preterm birth is a global and local challenge as the major contributor to neonatal and child mortality. Health, economical and psychological burden due to preterm birth are public health concerns. Even with a low neonatal mortality rate, Sri Lanka toils to care for preterm babies. However, quality data on factors contributing to preterm babies are not readily available to formulate preventive strategies.

**Objective:** To determine the risk factors, immediate triggering factors and critical outcome predictors of preterm births, development of risk prediction model and to assess the coverage of essential interventions for preterm babies in government hospitals of Colombo District

**Methods:** Two unmatched case-control studies were conducted to identify risk factors of preterm births (cases=374, controls=374) and contributory factors of critical neonatal outcomes (cases=227, controls=283). A case-crossover study (n=231) to identify triggering factors of preterm births and two descriptive studies to assess the coverage of recommended essential newborn care and interventions for preterm babies were carried out in the government hospitals in Colombo District.

A preterm prediction score (PPS) was developed and validated on a sample collected later in the same settings and the feasibility of PPS was assessed in the field.

**Results:** The population comprised of; 15 (4%) extremely, 34 (9.1%) very, 44 (11.8%) moderate, and 281 (75.1%) late preterm babies. Key risk factors of preterm births in the multivariate analysis included: multiple pregnancy (aOR=10.57, 95%CI:3.48-32.08), bleeding/spotting during pregnancy (aOR=3.51, 95%CI:1.77– 6.98), past preterm birth (aOR=2.83, 95%CI: 1.09-7.36), recent stressful life event (aOR=2.62, 95%CI:1.43-4.81), higher gravidity (aOR=2.58, 95%CI:1.35-4.90), unsatisfied own health (aOR=2.54, 95%CI:1.52-4.22), pregnancy induced hypertension (aOR=2.25, 95%CI:1.16-4.38), absence of dental assessment (aOR=2.16, 95%CI:1.23-3.81), unsatisfactory oral hygiene (aOR=2.01, 95%CI:1.33-3.04), longer standing during 3<sup>rd</sup> trimester (aOR=1.91, 95%CI:1.24–2.94) and cooking using firewood (aOR=1.51, 95%CI:1.01–2.25). No recent sexual intercourse (aOR =0.46, 95%CI: 0.26 -0.81) was a protective factor.

The immediate triggering factors for preterm labour were disturbed sleep (aOR= 6.601, 95%CI: 2.90-15.02) and travelling by three-wheeler (aOR =8.26, 95%CI: 3.37-20.22).

The risk factors for critical neonatal outcomes included; first minute abnormal APGAR (aOR=15.05, 95%CI: 5.44-41.60), birth weight <2000g (aOR=6.01, 95%CI:3.64-9.93), bleeding/spotting during pregnancy (aOR=3.08, 95%CI:1.64-.78), stressful life event during pregnancy (aOR=3.00; 95%CI;1.97-4.56 ), PPRM (aOR=2.50, 95%CI:1.48-4.20), frequent sexual intercourse (aOR=2.20, 95%CI:1.36-3.56), multiple previous abortions (aOR=1.85, 95%CI:1.24-2.75), husband consuming alcohol (aOR=1.77, 95%CI:1.17-2.66) and longer standing during the first trimester (aOR=1.62, 95%CI;1.09-2.42). Protective factors were; pre-delivery magnesium sulfate (aOR=0.15, 95%CI:0.05-0.46) and treated poor oral hygiene (aOR=0.27, 95%CI: 0.10-0.72).

PSS had an acceptable level of sensitivity (71%), specificity (68%), PPV (69%), NPV (70%), LR-positive (2.22), LR negative (0.43) and a good predictive ability (AUC=0.746). The development of critical neonatal outcome prediction score had to be withheld due to poor content and consensual validity.

Coverage of recommended preterm interventions was satisfactory except for the use of magnesium sulfate and kangaroo mother care.

Although coverage of essential newborn care was satisfactory, a low coverage was found for maternal abdomen delivery, delayed cord clamping, temperature measurement, educating about vitamin K, breastfeeding counselling and delayed weighing.

The PPS was a feasible tool as acceptability was high among mothers and midwives. It needs further evaluation before implementing at field level.

**Conclusions and Recommendations:** All contributory factors of preterm births should be made aware to the general public and relevant stakeholders. Preventive strategies for preterm births and critical neonatal outcomes should be formulated. Findings on preterm births, CNNO and triggering factors could be used at all levels to educate public and health professionals. Improvement in the essential newborn care and essential interventions on preterm babies is imperative.

**Keywords:** Preterm birth, risk factor, triggering factor, neonatal outcome, newborn care