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## Sri Lankan Newborns; Improving Survival and Well-Being

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### ABSTRACT

Every day, 6,400 babies die in the first month of life. Every year, an estimated 2.3 million newborns die worldwide. If current trends continue, 48 million children under five are projected to die between 2020 and 2030; half will be newborns. Therefore, further reduction in child mortality will only be possible through improving newborn health. Over time, Sri Lanka has effectively implemented measures to decrease the neonatal mortality rate. Nevertheless, neonatal fatalities constitute over 80% of all infant deaths.

Neonatal disorders are considered the leading cause of Disability-adjusted life years (DALYs) in whole age groups globally. In Sri Lanka, we could not see much improvement in the percentage contribution by neonatal disorders for the under-five age group global DALYs (40.5 % in 2019 and 41% in 1990) during the last few decades. This is purely due to slower progress in neonatal health concerns compared to other causes of mortality and morbidity that contribute to under-five mortality.

Based on the estimates, nearly 15 percent of term neonates need admission to the neonatal care unit (NCU), while 35 percent of preterm neonates need Neonatal Intensive Care Unit (NICU) admissions in Sri Lanka.

Although cost evaluations of newborn care are increasingly available from other countries, costing

data on Sri Lankan neonatal care services are largely unavailable. Among term neonates experiencing an 'adverse neonatal outcome,' the top four prevalent conditions were bacterial sepsis of newborn, respiratory distress of newborn, and neonatal jaundice from other and unspecified causes, birth asphyxia. They accounted for nearly 70 percent of the overall expenditure.

When considering the Lactation Management Center (LMC) services, the common problems encountered in the LMC were difficult attachment, incorrect burping technique, and poor weight gain. Irrespective of the reason for referrals, nine out of ten mothers were diagnosed with incorrect positioning and attachment while breastfeeding, highlighting the importance of ensuring the establishment of breastfeeding before discharge from the hospital.

Even though PHMs provide postnatal care in the field, nearly 30 percent of mothers believe that postnatal visits by PHMs were not helpful in any of the six aspects (Bathing, cleaning, dressing up, keeping baby warm, breastfeeding and recognising danger signs) of postnatal care at home.

Sri Lanka Every Newborn Action Plan (SLENAP) was developed further to reduce neonatal morbidity and mortality in Sri Lanka. The total estimated cost for SLENAP 2017-2020 priority activities was 7.8 billion rupees over four years. As per the national strategic directions to achieve the SDG target by 2035, Sri Lanka needs to achieve NMR of 2.2 per



1000 live births by 2030. To achieve that from the latest available NMR of 6 per 1000 in 2015, Sri Lanka needs to maintain a negative annual percent change of 6.5 percent from 2015 to 2030. That means if Sri Lanka is able to achieve that target by 2030, it will save nearly 7,000 newborns.

### **Sri Lankan newborns; improving survival and well-being (Oration transcript)**

Professor Senaka Bibile (1920–1977) was a distinguished Sri Lankan pharmacologist and visionary who made significant contributions to the field of pharmaceuticals and healthcare. Professor Senaka Bible was born on 13th February 1920. His father was Charles William Bibile, a 'Rate Mahaththaya', well known for his dedication to fulfilling the needs of poor people in Uwa Wellassa. Prof. Senaka, as a schoolboy, excelled in arts, music, drama, dancing and sports. He entered medical school, winning the Frazer Memorial Scholarship. He achieved first-class honours at 2nd MBBS and in the final MBBS examinations, obtaining distinctions in Medicine and Surgery and winning the Rockwood and Dadabhoy gold medals.

His work as the Regional Director of Health Services at Bingiriya demonstrated his altruism by providing free after-hours service in his quarters, with free medicine and food. He joined the University of Colombo in 1947 and completed a PhD at the University of Edinburgh. He was the first Professor of Pharmacology in Sri Lanka and a founding member of the Faculty of Medicine, University of Peradeniya. He became the first Dean of the faculty. He was instrumental in establishing the Medical Education Unit at the Faculty of Medicine and the Kandy Society of Medicine, an organisation that harnesses collaboration.

One of Bibile's most notable achievements was developing the concept of the "Rational Use of Drugs." This revolutionary idea emphasised making essential medicines accessible and affordable to all, especially in developing nations. He believed that a pragmatic and cost-effective approach to healthcare could significantly improve the well-being of communities. Bibile's philosophy prioritised the production of generic drugs over expensive branded medications, advocating for a fair pharmaceutical system that served the people's interests.

Despite his groundbreaking contributions, Prof. Bibile faced opposition from powerful pharmaceutical companies that resisted his vision of affordable generic drugs. However, he remained steady in his principles, dedicated to creating a more equitable healthcare system.

Tragically, Professor Senaka Bibile's life was cut short when he passed away in 1977 at the age of 57. Nevertheless, his legacy inspires those committed to global health equity and accessible healthcare. The Rational Use of Drugs concept and the State Pharmaceutical Corporation remain integral parts of Sri Lanka's healthcare system, serving as a testament to Bibile's enduring impact.

Finally, Professor Senaka Bibile was a pioneering pharmacologist whose life and work were dedicated to reshaping the pharmaceutical landscape in favour of affordability, accessibility, and equity. His legacy lives on through the enduring impact of his ideas and the institutions he helped establish, leaving an indelible mark on the pursuit of global health for all. In today's context, newborn health in Sri Lanka is a good example for understanding Professor Senaka Bibile's vision to develop a more equitable, affordable, and accessible healthcare system.

President and distinguished invitees, today I will talk about newborn health in Sri Lanka. The topic I have selected is "Sri Lankan Newborns: Improving Survival and Well-being".

Every day, 6,500 babies die in the first month of life. Every year, an estimated 2.6 million newborns die worldwide. If current trends continue, 48 million children under the age of 5 are projected to die between 2020 and 2030, half of them newborns. Therefore, further reduction in Child mortality will only be possible through improving newborn health (1).

### **Trends in neonatal mortality and disease burden**

Over time, Sri Lanka has effectively implemented measures to decrease the neonatal mortality rate. Infant mortality in Sri Lanka has decreased from 17.9 percent in 1992 to 8.5 percent in 2015, while neonatal mortality has decreased from 13 percent in 1992 to 6.0 percent in 2015 (2). Nevertheless, neonatal fatalities constitute over 80% of all infant deaths. Consequently, additional reductions in infant mortality are only achievable via

enhancements in newborn health. Neonatal mortality in Sri Lanka is primarily attributed to congenital anomalies, meconium aspiration syndrome, premature birth, and neonatal sepsis (3). According to the trend analysis and the forecasting done by Gunawardane et al. [4], based on the neonatal mortality data from 1990 to 2012, Sri Lanka is expected to have a neonatal mortality rate of 3.79 per 1000 live births by 2025. From 2000 to 2012 Sri Lanka achieved a negative annual percent change of 3.6.

Neonatal disorders are considered the leading cause of Disability-adjusted life years (DALYs) in whole age groups globally. When considering under five age group, in 2019, neonatal disorders accounted for 36 % of the group's global DALYs, increasing from 24 % in 1990 (5). Even in Sri Lanka, we could not see much improvement in the percentage contribution by neonatal disorders for the under-five age group global DALYs. This is purely due to slower progress in neonatal health concerns compared to other causes of mortality and morbidity that contribute to under-five mortality. During the same period, Sri Lanka has reduced the disease burden due to neonatal disorders among the under-five age group by 70 percent. But still, newborn causes account for 40 percent of under-five disease burden. Therefore, reducing neonatal mortality and morbidity will be key to reducing under-five mortality and morbidity in Sri Lanka.

### Outcomes of Sri Lankan Newborns

Based on the available literature, the prevalence of preterm births in Sri Lanka varied from 5 to 10 percent (6, 7). A study by Thanh et al. (8) covering 21 countries, including Sri Lanka, described outcomes among preterm newborns. According to the study findings, 33.8 percent of preterm neonates were delivered through Cesarean sections. The prevalence of low birth weight was 61.5 percent, while 14.3 percent had birth weights less than 1500 g. Nearly 10 percent of preterm newborns had an Apgar score < 7 at 5 minutes and 35.4 percent had NICU admissions.

Gunawardane et al. (9) evaluated the neonatal outcomes of term neonates at a teaching hospital in Sri Lanka. Before the initial hospital discharge, the neonatal outcomes of full-term neonates were described in a descriptive follow-up study. The

mean gestational age at delivery was 38.85 weeks, and most term neonates were delivered at 40 weeks. Out of all, 41 % were delivered before the completion of 39 weeks. Perera et al. [10] also reported similar findings in their study, where 42% of term neonates were delivered before the completion of 39 weeks. In the present study, the average birth weight of term neonates was 2925 grams. Among the participants, 13.7% had a birth weight below 2500 grams, and 10.9% had a birth weight of 3500 grams or higher. The mean birth weight was consistent with Perera et al. (10) study, where neonates' mean birth weight was 2930 grams.

Maternal prepregnancy weight, maternal height, and GWG all showed a significant positive connection with neonatal birth weight (BW) in an analysis conducted by Gunawardane et al. (11). The strength of association between maternal anthropometry and birth weight was higher in baby girls compared to baby boys. Maternal pre-pregnancy weight, maternal height, and gestational weight gain (GWG) was found to have significant relationships with neonatal birth weight in multiple linear regression.

The duration of the hospital stay was measured in inpatient days. In accordance with national policy, term neonates who are delivered vaginally and have a normal birth weight are to be discharged from the hospital 24 hours after their birth. Nearly 70 percent of neonates delivered via normal vaginal delivery were discharged within two days. Primarily attributable to the higher cesarean section rate among the study group, the median length of hospitalisation was three days.

At least one neonatal condition was diagnosed in 23 percent of the 1105 neonates included in the study. Admission to the neonatal care unit (NCU) was necessary for 15.8 percent of the term neonates. The median age at admission was one day, and most neonates admitted to an NCU were admitted on their first day of life.

Bacterial sepsis of newborns was the most prevalent neonatal condition, followed by respiratory distress of newborns and jaundice from unspecified and other causes. It is necessary to address the high incidence of bacterial sepsis by enhancing aseptic procedures from birth until the patient is discharged from the hospital.

### Cost of newborn care in Sri Lanka

Although cost evaluations of newborn care are increasingly available from other countries (12-14), costing data on Sri Lankan neonatal care services are largely unavailable. (15) Regarding preterm newborns, Nelumdeniya et al. (15) conducted a study to determine the cost management of extremely low birth weight (ELBW) infants in a tertiary care unit in Sri Lanka. The study includes 39 ELBW babies. Birth weight ranges from 540g to 980g. As estimated in the study direct cost per survivor was 82,207 rupees in the year 2010.

Due to this unavailability of costing data related to neonatal care services in Sri Lanka, Gunawardane et al. [16] conducted a cost analysis to explore the neonatal care cost of term neonates with 'adverse neonatal outcome'. 'Adverse neonatal outcome' was defined as a composite measure of neonatal death and morbidity, which needed admission to an NCU before the initial discharge point. The study observed 175 term neonates who had experienced an "adverse neonatal outcome." The main perspective taken was that of the Ministry of Health Sri Lanka. Despite the potential benefits of conducting an analytical costing study, this study was confined to cost analysis due to the limitations of available hospital-level data. Moreover, there is a lack of disease-costing studies focusing on neonatal care in Sri Lanka. So, this would be the first one of that kind.

Total neonatal care cost during the study period, including government and out-of-pocket costs, was 12.1 million rupees, of which 92.9 percent consisted of government neonatal care costs. The largest contribution to the government neonatal care cost of term neonates with 'adverse neonatal outcome' was by the shared direct costs, including staff salaries and allowances, cost of surgical consumables, and cost of shared equipment. Staff salaries and allowances comprise ninety percent of the shared direct cost. The present study found that drugs were more expensive than laboratory tests. With the relatively high prevalence of neonatal sepsis, the main contributor to that was the antibiotic treatment.

The median total neonatal care cost per term neonates with 'adverse neonatal outcome' was 50000 rupees, with an interquartile range of 39000 rupees to 79000 rupees. Infants admitted to a

Neonatal Care Unit (NCU) on their first day of life incurred higher average costs for neonatal care compared to those admitted later. Additionally, being delivered at 37 weeks, being male, and having a birth weight below 2500 g were factors linked to an increased mean total neonatal care cost for term infants experiencing 'adverse neonatal outcomes'.

Among term neonates experiencing an 'adverse neonatal outcome,' the top four prevalent conditions were, Bacterial sepsis of newborn, Respiratory distress of newborn, Neonatal jaundice from other and unspecified causes and Birth asphyxia. They accounted for nearly 70 percent of the overall expenses. Notably, Respiratory distress syndrome emerged as the main contributor, representing 25 percent of the total cost of neonatal care. This heightened cost in term neonates with respiratory distress syndrome was attributed to both the higher number of cases and the expensive support required. However, when considering the neonatal care cost per term neonate, birth asphyxia was the most costly neonatal condition to manage.

### Newborn Care in the field

A follow-up study (17) of 1105 term neonates included in the study by Gunawardane et al. (9) captured the neonatal outcomes following initial hospital discharge. A telephone interview was scheduled for term neonates, whose mothers had given consent to participate in the interview. The interviews were conducted between the 29th and 35th day following delivery for neonates already discharged from the hospital. Out of the initially recruited 770 mothers before hospital discharge, only 57 percent could be reached. Consequently, 421 mothers took part in and completed the telephone interview. Since the field services would not be changed based on their gestational age, this study provided a snapshot of the postnatal service delivery in the field for all newborns.

After being discharged from the hospital, almost half of the mothers sought medical advice for their newborns. Among those seeking advice, 71 percent consulted general practitioners, and 28 % reached out to specialists. Notably, all mothers acknowledging neonatal health issues sought advice from healthcare professionals. This practice

significantly contributes to sustaining a relatively low neonatal mortality rate in Sri Lanka.

"Exclusive breastfeeding" is giving no other food or drink – not even water – except breast milk. It does, however, allow the infant to receive oral rehydration salts (ORS), drops and syrups (vitamins, minerals and medicines). (18) Most women exclusively breastfed their babies. Out of 6 formula-fed babies, one had a hospital admission, while 4 out of the other five babies had sought medical advice from either a specialist or an ordinary doctor. The exclusive breastfeeding rate was higher than the Demographic Health Survey 2016/17 report. (2) Where the exclusive breastfeeding rate was 93.4 percent and 1.8 percent of formula feeding at one month of age.

This difference could be due to the difference in the gestational age at birth since premature neonates are generally at a higher risk of initiation formula feeding. Notably, among the six neonates, the five who had been on formula milk had received medical advice from a qualified practitioner. Therefore, it is crucial to emphasise to all healthcare professionals the significance of promoting exclusive breastfeeding over resorting to formula feeding.

There were no deaths among studied neonates following initial hospital discharge until their neonatal period was over. Nineteen neonates were hospitalised during the neonatal period and the most common reason for admission was breathing difficulty followed by the yellow colouration of the body.

According to the policy, the initial postnatal visit by the public health midwife (PHM) should occur within 1-5 days of delivery. In this study, only 37.7% of participants received the first visit within the specified timeframe, and 78.4% had the first home visit by the PHM within the initial 10 days after delivery. A mere 3% of neonates had not undergone any postnatal visit by the PHM by the time of the telephone interview conducted between 29 to 35 days postpartum. The survey revealed that the majority of neonates had a scheduled appointment for the postnatal clinic visit by the time of the assessment.

Six key aspects of postnatal care at home supported by the PHMs were assessed based on

the mothers' responses at the telephone interview. A considerable proportion of mothers stated that postnatal visits were not helpful in any of the six aspects questioned in the telephone interview. Postpartum visits had the highest impact on breastfeeding, followed by maternal competence in recognising danger signs. But the postpartum visit had the least impact on keeping the baby warm and dressing up of the baby.

### **Lactation Management Center to support breastfeeding**

As highlighted in Gunawardane et al. [17], quite a few mothers and babies face difficulties in breastfeeding, requiring professional help. In addition to home-based breastfeeding support by the Public Health Midwife, in order to provide quick outpatient support to breastfeeding mothers, the "Lactation Management Centre" (LMC) was introduced to the Sri Lankan specialist hospitals in the year 2000. To explore the activities carried out in LMCs, Gunawardane et al. (19) conducted an audit among LMCs established in the western province based on the LMC monthly returns received by the Family Health Bureau (FHB) in 2015. Even though twelve established LMCs in the Western Province, only eleven centers had sent at least one return to FHB during 2015.

In total, 24,353 mothers received care during this period. The median number of visits per month per center was 135, ranging from 2 to 941. The average number of visits per month per center was 219. Except for one unit, all the other units had a standard number of officers attached to the LMC and were kept open for the standard opening hours. The common reasons for LMC referrals were difficult attachment, incorrect burping technique, and poor weight gain.

Nearly 90% of the referrals were diagnosed to have incorrect positioning and attachment. Only 7.7 percent of mothers were diagnosed to have any breast condition. The commonest neonatal condition diagnosed was cleft palate / cleft lip.

Nearly 17 percent of neonates were LBW babies and one percent of newborns were formula-fed at the time of referral.

### Every Newborn Action Plan in Sri Lanka

Nearly half of all under-five deaths in 2020 occurred during the neonatal period. This has increased since 1990, as the global level of under-five mortality declines faster than neonatal mortality. Five million children died before their 5th birthday, and half of those deaths occurred among newborns.

Mortality can be assumed to be just the tip of the iceberg in the diseases that kill but often will lead to survivors into long-term effects. Underestimating and neglecting neonatal diseases carries this burden into adulthood, resulting in economic and social costs.

After recognising the importance of this issue World Health Organization and United Nations International Children's Emergency Fund proposed "Every newborn target" for the post MDG era, to meet Every Newborn target of ten or fewer neonatal deaths and ten or fewer stillbirths per 1000 births in every country by 2035.

Sri Lanka Every Newborn Action Plan (SLENAP) (20) to end preventable morbidity and mortality was developed with a vision to "ensure that Sri Lanka is a country in which there are no preventable deaths and illnesses of newborns or stillbirths, where every pregnancy is wanted, every birth celebrated, and women, babies and children survive, thrive and reach their full potential". The following two goals were identified to achieve the national vision on newborn health.

Goal 1; To reduce neonatal mortality rate from 6.5/1000 live births (2013) to 4.2/1000 live births by the end of 2020.

Goal 2; To reduce the stillbirth rate from 6.4/1000 births to 4.5/1000 births by the end of 2020.

In SLENAP, strategic objectives and key activity areas were identified and described under four priority packages: Care during labour and childbirth, Essential Newborn Care, Care of sick and small newborns and care beyond newborn survival.

### Cost Analysis of Sri Lanka Every Newborn Action Plan to End Preventable Morbidity and Mortality 2017-2020

Gunawardane et al. (21) performed a cost analysis of SLENAP. It was developed with the input of experts in relevant fields. The analysis provides guidance for the implementation of newborn healthcare activities at national and district levels. It also provides a basis for advocating funds to meet specific goals.

There were two parts to the cost analysis. Gunawardane et al. (21) focused on the cost of nine specific intervention packages included in Every Newborn Action Plan (ENAP) in the first part, and the second part focused on the cost of the priority activities selected from the SLENAP.

The costing of interventions was confined to the focus interventions used in the bottleneck analysis of Every Newborn Action Plan. In addition to the key ENAP interventions, intervention cost for newborn screening for Congenital Hypothyroidism was also included in the analysis since it is a very important newborn intervention in Sri Lanka.

Interventions are costed using a bottom-up approach. The model calculates the total cost per year and the cost per case. In this costing exercise, the intervention costing was limited to the inputs such as drugs, supplies, staff time required and the number of visits or hospital days.

Estimates of the staff time linked to intervention and the number of visits or hospital days were based on the WHO's one-health model intervention treatment assumptions and the available Sri Lankan norms and standards. The expert opinion was also obtained to specify the type and the amount of drugs, supplies and personal time required for each intervention and then cost these inputs using unit item costs in rupees. The unit prices of the items were mainly extracted from sources from the Ministry of Health (MOH) Sri Lanka. The population needing the specific interventions was identified using the publications of MOH Sri Lanka and other available literature. The cost of capital equipment used in specific interventions was calculated assuming 5-year working life and norms given by the MOH Sri Lanka.

When considering the average cost per intervention, care for newborn sepsis had the highest average cost per intervention, followed by cesarean section. However, cesarean sections were identified as the costliest Every newborn Intervention when considering the annual total cost per intervention. In the calculations, the cesarean section prevalence was considered as 33.8 percent. Nevertheless, according to the prevalence of cesarean sections in the year 2021, this cost would be much higher. According to the forecast performed by Gunawardane et al. (22) through the ARIMA technique, the Cesarean section rate will be increased to 50 percent by 2025, costing 12 million USD per year.

When considering the impact on total ENAP intervention cost, cesarean sections contributed for 32 percent followed by 23 percent due to care for newborn sepsis.

Priority activities selected from the SLENAP were costed in the second part of the analysis. This part of the costing mainly focuses on providing standard equipment sets to the facilities from 2017 to 2020 in addition to capacity-building activities. The data sources used to obtain the unit prices are similar to the intervention costing. These selected activities fall under three major areas in SLENAP: Care during labour and childbirth, essential newborn care, and care of sick and small newborns. Nearly three-fourths of the total estimated cost was allocated for the activities to promote and support care for sick and small newborns. This is mainly due to the strategic direction to develop a fully equipped neonatal care unit network with four levels of facilities.

According to the estimated cost of establishing standard neonatal care units and newborn care-related settings, the cost to establish a neonatal care unit range from 327000 to 630000 USD. A standard 8-bed labour room will cost around 55000 USD.

The total cost for SLENAP 2017-2020 priority activities was 7.8 billion rupees. Based on the estimated cost, 74 per cent would be required for the care of sick and small newborns. This finding emphasises the importance of preventing preterm births and adverse outcomes among newborns.

The total health expenditure in 2017 was around 479 billion rupees, around 3.6% of the GDP. (23) Based on the total health expenditure in 2017, the total expenditure for SLENAP 2017-2020 priority activities would only account for 1.6 per cent of total health expenditure. However, the ministry had spent 90 per cent of the expenditure on recurrent costs, which hinders the implementation of strategic plans like SLENAP.

According to the provisional data in 2019, Sri Lanka had an NMR of 5.03 per 1000 live births, which is a bit off from the expected NMR of 4.2 by 2020. This may be due to the incomplete implementation of SLENAP during the stipulated time frame. This is high time to evaluate the SLENAP 2017-20 implementation level, identify the bottlenecks, and progress towards the 2030 SDG target.

### **How many lives are at stake?**

According to the analysis by Lawn et al. (24) on neonatal mortality, to achieve the global SDG target of 10 or fewer neonatal deaths per 1000 live births by 2035 globally, Sri Lanka needs to achieve a neonatal mortality rate of 2 per 1000 live births by 2035.

As per the national strategic directions to achieve the SDG target by 2035, Sri Lanka needs to achieve an NMR of 2.2 per 1000 live births by 2030. (25) To achieve that from the latest available NMR of 6 per 1000 in 2015 by the Registrars General Department, Sri Lanka needs to maintain a negative annual per cent change of 6.5 per cent from 2015 to 2030. That means if Sri Lanka can achieve that target by 2030, it will save nearly 7,000 newborns.

### **Recommendations**

There are quite direct implications of the evidence generated to promote the health of neonates in Sri Lanka. Prevention and control of infection at the time of birth in the labour room and the operation theatre, in the postnatal wards and in the neonatal units should be given due attention to reduce bacterial sepsis among neonates. The effective coverage of postnatal domiciliary care needs to be improved. Methods to ensure timely postnatal visits by the PHM need to be evolved. The skills and competencies of the PHMs in the provision of domiciliary care for neonates should be improved. Especially to guide the mother in the essential care

of the newborn should be improved using techniques such as observation checklists. More research is also needed to understand the most appropriate approaches in the field neonatal care to maximise the impact of postnatal visits by Public Health midwives.

The use of clinical audit checklists for labour management, labour induction, caesarean sections and prevention and control of infections at birth, in the postnatal wards and neonatal units will improve newborn health. A clinical auditing system and a review mechanism should be developed, to routinely monitor the indications and outcomes regarding induction of labour, the indications for cesarean sections and rates of infection in the postnatal wards and neonatal units. Considering the cost implication of adverse outcomes among neonates, all possible measures must be taken to prevent them, especially as a country thriving through an economic crisis. Finally, it is high time to evaluate the SLENAP 2017-20 implementation level, identify the bottlenecks, and progress towards the 2030 SDG target.

At this juncture, I sincerely thank my beloved supervisor, Dr. Dhammika Rowel, Consultant Community Physician, Health and Nutrition Officer, UNICEF Sri Lanka, and the former programme manager of newborn health at Family Health Bureau, for her continuous guidance and support. Dear Madam, without your guidance, I would not be able to deliver this oration on newborn health today. Prof. Samath D Dharmaratne, my postgraduate supervisor, thank you, sir, for your guidance and support. The Director Family Health Bureau and all the program managers in past and present for their support. President, secretary and council members of Kandy Medical Society and the family of Prof Senaka Bibile. Thank you very much for this opportunity to share this evidence on newborn health in Sri Lanka. Dean Faculty of Medicine Peradeniya, Thank you, madam for your guidance and support during the past 3 years. All my department colleagues are remembered at this moment, thankfully, for their kind support. Distinguished invitees, ladies, and gentlemen, I thank you for your presence and your patience in listening. Last but not least, I thank my parents, my sister, my wife and my daughter for being my strength in every step of the way.

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