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Perinatal Society of Sri Lanka
FOUNDED 2001
Towards healthier mothers and newborns

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HIGHLIGHTS OF THE ISSUE

PSSL Oration 2023:
Low birth weight – the less than 2500g cut-off: is it applicable to Sri Lanka?

Leading article :
The Robson Ten Group classification: will it help to optimize the Caesarean rates?

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Editorial

Good health begins in the womb, but climate change is a growing threat to the unborn

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Women are disproportionately impacted by climate change, and it has a direct and indirect effect on the survival of childbirth and pregnancy. The factors that affect pregnancy outcomes and long-term health go far beyond individual behaviours. A complex system of environmental, social, and economic factors is inextricably linked to health outcomes at every stage of life. Climate change is an increasingly salient part of this system, and it can harm early development in various ways.

In 2007, the Intergovernmental Panel on Climate Change presented much evidence about global warming and the impact of human activities on global climate change. The Lancet Commission has identified many ways climate change can influence human health: lack of food and safe drinking water, poor sanitation, population migration, changing disease patterns and morbidity, more frequent extreme weather events, and lack of shelter. Pregnant women, the developing foetus, and young children are considered the most vulnerable members of our species.

Poor nutrition during pregnancy, for example, has been linked with a range of adverse outcomes for children, including high blood pressure and metabolic diseases. The effects of smoking or being exposed to second-hand smoke during pregnancy are also widely recognised and include increased risk of stillbirths and congenital disabilities. We also know that adverse pregnancy outcomes, including preterm birth and low birth weight, are risk factors for health problems in adulthood.

Air pollution has been linked to a range of adverse pregnancy outcomes, including preterm labour and low birth weight, which are risk factors for conditions such as cardiovascular disease and diabetes in adulthood. Exposure to pollution can also affect lung development and function and is thought to contribute to the development of childhood asthma. Air pollution disproportionately affects socioeconomically disadvantaged populations in many countries.

Emerging evidence from around the world suggests that more extreme temperatures – especially high temperatures are linked to climate change and associated with preterm birth, low birth weight and stillbirth. These findings have garnered some attention in recent years, but plans and resources related to climate change or extreme heat often fail to address pregnant women as a vulnerable population.

Some mosquito-borne diseases, such as malaria and Zika virus, are known to harm foetal health and development. Malaria affects placenta function and increases the risk of low birth weight, preterm birth, and miscarriage. Zika virus passes from mother to foetus and causes a severe brain defect known as microcephaly as well as damage to eyes, joints, and muscles. As climates become wetter and warmer, mosquito populations will thrive, facilitating the spread of the viruses they carry. If no climate action is taken, mosquito-borne diseases could reach an additional one billion people by 2080, with most first exposures occurring in Europe.

Many nutrients are critical for pregnant women and their babies to support good health and development. However, changing weather patterns and extreme weather events can severely affect food supplies and the availability of critical nutrients in some regions. In land-locked, low-income countries, especially, food supplies are volatile and reliant on local weather conditions. In these countries, extreme weather can reduce nutrient supplies by as much as 7.5%. An estimated 250 million children under five are currently at risk of poor development because of poverty and stunting caused by malnutrition, repeated infection, and limited psychosocial stimulation. As climate change affects weather patterns and food supplies, malnutrition could pose a significant threat.

Climate action is a core part of giving children the best start. Organisations worldwide, including WHO and UNICEF, highlight the importance of the first 1,000 days in setting the foundations for lifelong development and health. Giving every baby the best start in life is even written into the national policy of many countries, highlighting this period's importance in shaping a person's lifelong health and well-being. While the role of environmental influences is sometimes acknowledged, the wide-ranging implications of climate change, particularly on the most vulnerable populations, are rarely included in the discussions. Just as the social determinants of health are firmly established in the public health parlance, climate change must also be seen as a critical determinant of health right from the start of life.

Dr. Surantha Perera
Managing Editor, SLJPM

Leading Article

The Robson Ten Group classification: will it help to optimize the Caesarean rates?

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The Ten Group Classification System (TGCS) was introduced in 2001 to classify perinatal outcome, but was first popularized for analyzing caesarean section (CS) rates [1]. The main idea of the system is to prospectively classify women into clinically relevant groups based on category of pregnancy (single cephalic, single breech, single oblique or transverse lie, multiple pregnancy), previous obstetric record (nulliparous, multiparous, multiparous with a previous CS), course of labour and delivery (spontaneous labour, induced labour, CS before labour) and gestational age (preterm or term) (2). TGCS is now widely used, especially in Europe for analysing caesarean section rates and is, according to a systematic review, the most appropriate classification system for analyzing CS rates.

In 2015, the World Health Organisation (WHO), proposed the TGCS as a global standard for assessing Caesarean Section rates at health care facilities (3). Not a single country has applied this classification as a whole in analysing data and determining on making national recommendation. However, it had been used in a few institutions with the objective of standardizing care with changing practices to improve the maternal and perinatal outcomes. These will be unique in terms of incidence and clinical significance within the TGCS and, once collected within the TGCS, data validation and interpretation become easier, more relevant and more rewarding. Overall caesarean section rates are unhelpful, and caesarean section rates should not be judged in isolation from other outcomes and epidemiological characteristics. Better understanding of caesarean section rates, their consequences and their benefits will improve care, and enable learning between delivery units nationally and internationally. (4)

The caesarean section rate increased overall between the two surveys from 26·4% in the WHOGS to 31·2% in the WHOMCS, p=0·003 (WHO Global Survey of Maternal and Perinatal Health (WHOGS; 2004–08) and the WHO Multi-Country Survey of Maternal and Newborn Health (WHOMCS; 2010–11),) and in all countries except Japan. Use of obstetric interventions (induction, prelabour caesarean section, and overall caesarean section) increased over time. Caesarean section rates increased across most Robson groups in all HDI categories. Use of induction and prelabour caesarean section increased in very high/high and low HDI countries, and the caesarean section rate after induction in multiparous women increased significantly across all Human Development Index (HDI) groups. The proportion of women who had previously had a caesarean section increased in moderate and low HDI countries, as did the caesarean section rate in these women. (5)

This ten-group classification is more or less an audit to assess the overall quality of care how it affects the maternal and perinatal out comes. This may not bring the cs rates down in institutions with high section rates unless the indications are rationalized in each group of ten. Parity, lie of the baby, onset of labour

and gestational age affects the outcome of the labour and delivery. (6)

Extreme views on low or high rates of caesarean section are not helpful, especially if the arguments are based on selected evidence. Discussions about reducing caesarean section rates without taking other factors into account are at best inappropriate and at worst dangerous. On analying the increased caesarean rates, it has been shown to increase in first pregnancies due to the demand based on the uncertainty of the labour out come by the woman leading to vaginal delivery and in subsequent pregnancies due to ill treatment or the worse experience in the previous vaginal deliveries. Induction of labour for non-clinical indications have shown to be increased without improving perinatal outcome. Failed inductions contribute to increases in cs rates. Analysing the TGCS in 2 and 4 groups with indications and the perinatal outcome could reduce the number of inductions and cs rates in those two groups. Judicious use of oxytocin for dysfunctional labour in group one and three may reduce prolonged labour and complications especially postpartum complications like postpartum haemorrhage.

There seems to be very low threshold for caesarean sections in medically indicated women. The reasons include (1) different views on the management of labour and delivery, organisational issues; and (2) societal intolerance of poor outcomes and experience, and a culture of blaming individuals or systems (a significant concern among professionals). (7)

Following applications in an institution or a unit could be helpful in achieving improved quality of care with better outcomes:

- Classification of information: the 10 groups and describing acceptable ranges of outcomes and events
- Assessment of management and interpretation of data
- Modification of management improving processes.
- Audit: When, who, how, why prelabour, labour and post-delivery outcome and events applying in to TGCS and auditing cycle will hope to improve maternal and perinatal outcomes. (7)

Efforts to reduce C-section rates typically involve a combination of factors, including:

- Medical Guidelines: Ensuring that medical guidelines for obstetric care are evidence-based and followed appropriately. This may include encouraging vaginal birth after cesarean (VBAC) when clinically appropriate.
- Education and Training: Ensuring that healthcare providers are well-trained in techniques to manage labor and delivery effectively, reducing the need for C-sections in non-medically necessary situations.
- Patient Education: Providing expectant mothers with information about the risks and benefits of C-sections versus vaginal deliveries and involving them in the decision-making process.
- Quality Improvement: Hospitals and healthcare systems can implement quality improvement initiatives to monitor and reduce unnecessary C-sections.
- Continuous Monitoring: Regularly reviewing C-section rates and the reasons behind them, as well as implementing strategies to address any identified issues.

The Robson Ten Group Classification can be a valuable tool in these efforts by providing data and insights that help healthcare providers and policymakers target specific groups where C-section rates may be higher and develop strategies to address the underlying causes.

However, it is just one component of a broader strategy to reduce C-section rates, and its impact depends on how it is used in the context of a comprehensive approach to improving maternity care.

Medical practices and guidelines are changing over time, therefore, reviewing more recent literature and guidelines for the most up-to-date information for the applications in clinical practice is recommended.

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Oration of the Perinatal Society of Sri Lanka – 2023

Low birth weight – the less than 2500g cut-off: is it applicable to Sri Lanka?

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Chief guest Honorable Yasantha Kodagoda, guest of honor Professor Mike Robson, President, Members of the Council, Past presidents, Life member of the Perinatal Society of Sri Lanka, Distinguished Invitees, Ladies and Gentlemen. I consider this as an honour and privilege to be able to deliver this year's Perinatal Society of Sri Lanka oration and I thank the President and the Council for giving me this opportunity.

Introduction

Low birth weight is defined as babies with a birth weight of less than(<) 2500g by the World Health organization. This 2500g cut appears to have been linked with 20 times higher mortality in this birth weight category, compared to those who were heavier at birth[1]. However, we now know that reduction in birth weight is the result of either prematurity or fetal growth restriction, and that mortality is directly linked to the severity of prematurity or the severity of growth restriction, rather than having an independent relationship with birth weight itself[2]. Categorization of mortality according to low-birth-weight infants was first reported by the French obstetrician Pierre Budin (1864-1908), in 1898 as 95% for birth weight <1200g, 85% for birth weight between 1200-1499g, 61% for birth weight between 1500-1999g and 33% for birthweight > 2000g[3]. John Ballantyne, a Scottish physician and obstetrician was the first to describe prematurity, as those between a birth weight between 3.5 – 4lbs (1590g-1810g) with a mortality of 50% and morbidity of 100%[4].

The origin of the 2500g cut off for birth weight appears to have been from the work done by Prof. Aravo Henrik Ylppo (1887 – 1992), also known as the Finnish father of Paediatrics, who was the first to replace the term 'congenital weaklings' with 'premature infants', introduced the concept for birth weight and length for gestational age and formulated the first preterm growth curves[5]. A study conducted in 1921 that acknowledged that the low birth weight cut off at <2500g was arbitrary, reported that mortality was 10 times higher in this category with a birth weight <2500g[2]. In 1935, this cutoff was codified by the American Academy of Paediatrics, that defined prematurity as birth weight ≤2500g[2]. In 1948, the First World Health Assembly adopted this as the global standard, following the recommendation of the World Health Organisation (WHO) Expert group on Prematurity who defined prematurity as birth weight ≤ 2500g or "immature" or <37 weeks gestation[2].

Awareness of the limitations in using birthweight to define prematurity was seen in the 1950s, where differences between aetiologies were described for prematurity and low birthweight. In 1955, Schlesinger and Allaway clearly stated that birth weight was a poor indicator of prematurity although it was easier to measure than gestational age and demonstrated that mortality was decreased within the higher weight (<2500g) and higher gestational age

(<36weeks) categories[6]. Improvement of the quality of data demonstrated the association between higher neonatal mortality and morbidity in infants with lower birth weight and earlier gestational ages[7-14]. Increase in the understanding of the differences between low birth weight, prematurity and small for gestational age (SGA) led to the AAP proposing nomenclature to characterize SGA in 1966[15,16].

Increase in knowledge on the effect of population characteristics (ethnicity, geographical location and socioeconomic status) that modified the relationship between birth weight and adverse birth outcomes, led to questioning of the appropriateness of the universal birth weight cutoff [9-10,17-250]. Modeling of birth weight was used to determine the morbidity and mortality risk within and between populations[18]. Following comprehension that birth weight differed between populations, Rooth described that the universal cutoff of 2500g was inadequate and proposed a cutoff of birth weight less than 2 standard deviations below the local population mean[23].

Studies done in the 1950s questioned the relationship between prematurity and low birth weight where higher mortality was associated with lower gestational age rather than being based on birth weight alone[6,7]. This led to the first description of 'small for gestational age (SGA)' by the AAP in 1966[8], which evolved in to its current definition, as birth weight below the 10th centile or – 2 standard deviations (-2SD) below the reference population in the 1990s[9-11]. Meanwhile research done in 1970s described how birth weight was affected by different characteristics of the population, such as the sex, ethnicity, geographical location and socio economic status[12-16]. This led to the understanding that an universal cutoff of 2500g may not be appropriate, due to difference in birth weight among different populations, leading Rooth to propose the use of a birth weight that was less than 2 standard deviations below the local population mean in 1980[23]. The WHO was also seen to question the validity of the 2500g cut off in 2004, due to the occurrence of high incidence of low birth weight without a high neonatal mortality in Sri Lanka[30]. In 2012, antenatal ultrasound scan was noted to be a more reliable predictor of morbidly and mortality as it helped to differentiate between prematurity and small for gestational age. This led to the WHO stating that reliance on the 2500g cutoff as a predictor of morbidity and mortality should be limited to settings that are unable to determine gestational age[31]. The usefulness of the 2500g cutoff is obsolete In Sri Lanka, where early antenatal ultrasound between 8-13 weeks of gestation is standard of care. However, a population specific cutoff for SGA at term gestation would help to identify the SGA babies that need monitoring in the postnatal ward.

This brings us to question if the 2500g cut off represented SGA in the WHO child growth standard (WHO-CGS). Interestingly, the birth weight of 2500g coincided only with the 3rd centile for boys in the WHO-CGS and was only suitable as a cutoff for SGA at term gestation only for boys. The 3rd centile for girls in the WHO-CGS was 2400g, being different from the 2500g cutoff [32,33]. The next question is, whether WHO-CGS represents the growth of healthy children in Sri Lanka? A review done across 55 countries by Natale et al. found difference in weight, height and head circumference in >20% from the WHO-CGS where the means of European countries were consistent outliers above the mean in contrast to the means of developing countries that were consistently below the mean[34]. Cross sectional data from Gampaha and Kandy districts in Sri Lanka, also supported these findings, where the birth weight, length and head circumference were found to be significantly lower than the WHO-CGS[35,36]. However, WHO-CGS growth data from birth to 2 years were

obtained from longitudinal data using the LMS method[37]. This highlighted the need for a longitudinal study on healthy Sri Lankan children with methodology comparable to the WHO-MGRS.

This led us to undertaking the first longitudinal study on anthropometry, body composition, infant development and IYCF practices from birth to 2 years in Sri Lanka as well as in South Asia. This study also formed the Sri Lankan component of the first global longitudinal body composition study which also included Australia, Brazil, India, Pakistan and South Africa and was funded by the International Atomic Energy Agency of which the findings were published not only. In the American Journal of Clinical Nutrition but also in the European Journal of Clinical Nutrition. This is the first study that has comprehensively described longitudinal changes in growth within the first 2 years of life (anthropometry, growth velocity and body composition) in a study population, which had very high adherence to IYCF and with similar methodology to WHO – MGRS, in addition to describing the factors affecting body composition (birth weight, infant feeding, placental factors and cord blood insulin, leptin, adiponectin and IGF-1), as well as the effect of body composition, on infant development.

Methodology

We conducted a descriptive, longitudinal, cohort study at the University of the De Soysa Hospital for Women, Sri Lanka from 0.1.07.2015 to 31.12.2019.

All pregnant women admitted to the university obstetric ward at a period of gestation from 37 to 41+6 weeks i.e., term gestation, were screened twice daily on all weekdays. All healthy babies born to women admitted to the University obstetric wards at term gestation, with a singleton pregnancy, aged over 18 years, living in the Colombo district, who were not smoking and had an intention to breastfeed with an income above 1st quintile according to the 2006/2007 census data and agreed to attend follow up one-monthly during the first year and two-monthly during the second year were included in the study. Women who did not fulfil the inclusion criteria were excluded from the study. Infants with congenital abnormalities, disease conditions affecting growth, illness requiring hospital admission or an Apgar score < 8 at 5 minutes were excluded from the study.

This study was funded by the International Atomic Energy Agency (IAEA). Sample size was calculated as 150 with a power of 90% to detect differences in FM and FFM among males and females at 2 years of age[36]. Ethics approval was obtained from the Faculty of Medicine, University of Colombo (EC-14-145).

Data was collected using interviewer administered questionnaires and data recording forms. English questionnaires were translated and back translated into Sinhala and Tamil and was pretested on 25 infants. Questionnaires were administered in the language of the parent's choice where separate questionnaires were used for screening and birth anthropometry, parental information, infant follow up, 24-hour dietary re call and food frequency.

Period of gestation (POG) was assessed using crown rump length measured via antenatal ultrasound scan done between 8-13 weeks of period of amenorrhea as per national standard. In case of unavailability, biparietal diameter measured by antenatal ultrasound done between 13-20 weeks was used. Last regular menstrual period of the mother was used to assess POG when both these options were not available.

Anthropometry was performed by me in all study participants following training and certification by an International Society for the Advancement of Kinanthropometry (ISAK) Level 2 accredited anthropometrist

according to WHO-MGRS protocol. Second measurements were performed by research assistants trained by me. Father's anthropometry and mother's height were measured at recruitment while the mother's pre pregnancy weight was obtained from the pregnancy record. Measurements at birth were made within the first **12-24** hours. Measurements of weight, length, circumferences (chest, abdomen, mid arm, head) and skinfold thickness (biceps, triceps, subscapular and supra iliac) in the infant, parents' weight and height were measured to the nearest 5g, 1mm, 1mm and 0.2 mm, 100g and 0.1cm respectively. All measurements were done using Seca GmbH instruments except for the Harpenden skinfold caliper according to the WHO-MGRS protocol. Instruments were calibrated twice weekly. This study adopted the same quality control methods for anthropometry as used in INTERGROWTH-21, with weekly calibration of instruments and 6 monthly standardization. Technical error of mean was at the level of skilled anthropometrist for both first and second intra observer measurements[38].

Placental weight was measured using the same instruments to the nearest 5g whereas the maximal diameter and maximal thickness were measured using a stainless-steel ruler.

Dietary data was collected using 24-hour dietary recall, food frequency and interviewer administered questionnaires. Individual dietary counselling was done regarding the dietary components, consistency, timing of meals / water / breastfeeds, mealtime behaviour and interpretation of the growth curves. A mutually agreed plan was documented in the infants clinic book in the preferred language at each visit and was followed up by myself. All participants parents were given access to a 24-hour hotline to obtain advice regarding diet / breastfeeding. IYCF practices of the study participants were assessed using 2021 UNICEF/WHO guidelines and the 2007 Sri Lankan Ministry of Health guideline[39-40].

Body composition is what we are made of and can be described according to the 2-compartment model, where the body is described as fat and fat free mass. Higher compartment models describe the sub components of the fat free mass. Body composition was assessed using the deuterium, which is a naturally occurring stable isotope of hydrogen. The dilution principle was used to assess body composition after the administration of deuterium oxide. Deuterium oxide (D, 99.9%) was administered at 0.1g/kg at 3,6,9,12,18 and 24 months. Administered dose was calculated by determining the difference in weight between the pre and post administration weights of the syringe containing the dose using a 5 stage Shimadzu analytical balance. Saliva samples were obtained using cotton swabs in to screw capped NUNC vials prior to dosing as well as 2.5 and 3 hours after dosing and was stored at -20C. Concentration of deuterium oxide in saliva was measured using Agilent Fourier Transform Intra Red (FTIR) spectroscopy using micro lab software. Multiple methods including daily diagnostics, testing samples in duplicate and excluding samples with total body water percentage outside the range of 40-75% were used to ensure strict quality control[41]. Total body water was calculated using the dilution principle. Fat free mass (FFM) was calculated using Fomon's age and sex specific hydration factors[42]. Fat mass (FM) was calculated by subtracting FFM from the body weight. Fat mass index(FMI) was calculated by dividing the fat mass (kg) by the length (cm) whereas fat percentage (Fat %) was calculated by dividing the FM by the body weight.

Enzyme Linked Immuno Sorbent Assay (ELISA) was conducted for leptin, adiponectin, insulin and IGF-1 in cord blood (10ml) that was collected at the time of birth and stored at -80C after centrifuging. DRG

Leptin Sandwich ELISA EIA-2395 (DRG Instrument GmBH, Germany), DRG Insulin Sandwich ELISA EIA 2935 (DRG Instrument GmBH, Germany), Demeditec Adiponectin ELISA DEE009 (Demeditec Diagnostics GmBH, Germany) and Demeditec IGF-1 600 ELISA kit DE4140 (Demeditec Diagnostics GmBH, Germany) were used to measure leptin, insulin, adiponectin and IGF-1 respectively. Quality control was ensured via the use of control samples, Levey Jennings charts, monitoring intra and inter assay variation, running samples in duplicate with CV < 20% between duplicates and ensuring that sample results were within the assay range as specified by the manufacturer as well as within clinical range.

I also conducted Bayley III assessments on all participants at 3,6,9,12,18 and 24 months in the family's language of choice using the unmodified tool, where raw scores were recorded for all domains. Scaled scores and growth scores were derived from raw scores, whereas composite scores were derived from scaled scores.

Statistical analysis was done using SPSS version 27 for Mac. Data cleaning was performed using box and whisker plots for cross sectional data and 'plot clean' and 'velout' functions using Sitar on R studio. Normality of the distribution was checked using the Shapiro Wilk test. Z scores were determined using the WHO anthro analyser for MacBook. Longitudinal curves and percentiles were determined via LMS chart maker. Relationships between variables were determined using the independent sample T test, Pearson and Spearman correlation and simple, multiple and hierarchical linear regression after satisfying all assumptions. Age at each visit was calculated using the visit date and the date of birth. A 30-day period was taken as a month.

Results

The total screened were 4140, of which only 877 were eligible, of which only 427 consented and were recruited prior to delivery, of which only 344 consented after delivery. Seven babies were excluded due to birth records not being available resulting in a study population of 337 at birth. Study population was 157, 122, 76, 44 and 36 at 1,3,6,12,18 and 24 months of age. The main reason for the dropouts were that many parents moved out of the study area to their grandparents' place of residence for extended family support and found it difficult to attend the clinic visits. None of the children who attended follow up visits were found to have any disease condition affecting growth or requiring hospital admission.

Comparison of socio demographic data of our Sri Lankan study population with the WHO MGRS revealed many similarities between the two groups, such as the number of live births,, proportion of families with children younger than 3 years, parity, maternal age and ownership of commodities such as piped water, flush toilet, refrigerator, gas / electric cooker, telephone and vehicle apart from significantly lower parental height and median monthly income in our Sri Lankan study group[43]. In contrast, our Sri Lankan study population showed a significantly higher adherence to IYCF guidelines, especially breastfeeding, where initiation of breastfeeding was 100% vs 65.7%, exclusive breastfeeding within the first 4 months was 97.8% vs 74.7%, breastfeeding at 12 months was 99% vs 68.3%, initiation of complementary feeding by 6 months was 100% vs 99.5% and age of initiation of complementary feeding was 5.5 ± 1 vs 4.9 ± 3.5 months in our Sri Lankan study population and WHO-MGRS respectively.

Comparison of birth anthropometry revealed that our Sri Lankan study population showed a left shift of 0.6 – 0.9

compared to the WHO-MGRS, with lower z scores for length for age, weight for age and weight for length by 0.6-0.9[43]. Same 0.6-0.9 left shift was noted in the z scores from birth to 2 years in our study population, despite the higher adherence to the IYCF guidelines in our study population compared to WHO MGRS. This resulted in weight for age, length for age and weight for length < -1SD being falsely labelled as underweight, stunting and wasting with the use of WHO-CGS, highlighting the need for country specific growth references [44].

Using the longitudinal growth curves we developed for our healthy Sri Lankan population, it was noted that the 3rd centile for weight for age at birth, i.e., the -2SD cut off, signifying the cut off for small for gestational age (SGA) at term gestation, was at a birth weight of 2.2 kg, for both boys and girls.

Next let's have a look at the biological evidence to determine whether the birth weight of 2.2 kg as determined by the -2SD cut off based on our population specific longitudinal growth curves is a better indicator of SGA at term gestation that the low birth cut off at 2.5 kg.

SGA is associated with higher FM, obesity and non communicable disease (NCD) [45,46]. Therefore, body composition was compared at 3, 6, 9, 12 and 24 months of age between babies with a birth weight that was appropriate for gestational age (AGA) with that of SGA. SGA was taken as < 2.5kg as per current low birth weight cut off in the first comparison, whereas SGA was taken as < 2.2kg as per proposed cut off for SGA determined by the population specific growth references developed in this study in the second comparison. When 2.5kg was taken as the cut off for term SGA, there was no significant difference in the fat mass indicators between SGA and AGA although FMI and Fat % were found to be marginally higher in SGA vs AGA at 6, 9 and 24 months of age. In contrast, when 2.2 kg was taken as the cut off for SGA, all fat mass indicators i.e., FM, FMI and Fat % were higher in SGA compared to AGA with significant differences ($p<0.05$) in all parameters at 6 and 9 months of age. So, is 2.2kg better than 2.5kg in demonstrating a higher fat mass leading to future risk of non-communicable disease (NCD) in term SGA? The answer is clearly, yes.

Let's have a look at the placenta and see if we can find supportive evidence to corroborate the changes in body composition detected by the deuterium dilution method.

This is the first study to describe placental thickness being related to infant body composition, where increase in placental thickness was associated with an increase in fat % at 18 months of age[47]. In addition, the ability of under nourished fetuses with certain genotypes to expand the placental surface to obtain more nutrients have also been described by Erikson et al[48]. Comparison of placental parameters using the 2.5 kg cut off revealed, that the placentas of SGA babies had a significantly lower ($p<0.05$) weight and diameter with sparing of the placental thickness. In contrast, the use of the 2.2kg cut off revealed, that the placentas of SGA babies had a significantly lower ($p<0.05$) weight with sparing of the placental thickness as well as its diameter. An SGA baby would be expected to have a smaller placenta with lower weight, diameter as well as thickness, where all parameters are expected to be significantly smaller compared to AGA. Not finding a significant difference between some of the placental parameters indicate that these parameters may have an active role in the SGA baby, where increase in diameter may have a role in increasing the surface area and increase in thickness is related to the body composition resulting in increased fat mass at 18 months of age. While the 2.5 kg cut off demonstrated sparing of the placental thickness, the 2.2 kg cut off demonstrated sparing of both the placental diameter as

well as the placental thickness. Therefore, is <2.2kg better than <2.5kg in demonstrating placental characteristics in term SGA? The answer is of course, yes.

Now, let's have a look at the adipokines and growth factors in the cord blood. Our study revealed that insulin was associated with an increase in FM at 24 months of age, IGF-1 with an increase in FFM at 9 months of age, adiponectin with the healthy body composition pattern of the breastfed baby in contrast to leptin which was not associated with body composition from 3-24 months of age[49]. These findings were agreement with previous research findings[50-54]. Comparison of cord blood adipokines and growth factors between SGA and AGA revealed that SGA babies had a significantly lower ($p<0.05$) level of leptin and IGF-1 level with the 2.5 kg cut off compared to a significantly lower ($p<0.05$) level of leptin, IGF-1 and insulin with the 2.2 kg cut off. The difference in insulin was detected only with the 2.2kg cut off, whereas the difference in leptin and IGF-1 was detected with both cut offs. A systematic review and meta-analysis done by Manapurath et al. also revealed that SGA was associated with a significantly lower level of insulin, leptin and IGF-1 in agreement with our study findings, while also indicating that SGA babies are born with lower levels of FM as well as FFM[55]. Is <2.2kg better than <2.5kg in demonstrating cord blood factors in term SGA? The answer is, yes again.

SGA babies are described to have catch up growth mainly due to an increase in fat mass[46]. Our study found that abdominal circumference and skinfold thickness showed the highest correlation with FM compared to weight, length and circumferences of head, chest and arm. Our study findings agreed with that of previous researchers[56-57]. Comparison of weight for age, length for age, abdominal circumference for age and subscapular skinfold thickness for age charts between SGA and AGA using the 2.5 kg and 2.2 kg cut offs demonstrated that catch up growth was demonstrated only with the 2.2kg cut off. So, is <2.2kg better than <2.5kg in demonstrating anthropometric changes depicting catch up growth in term SGA? And of course, it's yes again.

Comparison of Bayley III scores at between SGA, AGA and LGA babies at term gestation at 3, 6, 9, 12, 18 and 24 months of age, using the 2.5 kg and 2.2 kg birth weight cut offs revealed that there was no significant difference in Bayley III scores with the 2.5kg cut off. However, the use of the 2.2 kg cut off demonstrated lowest scores ($p<0.05$) in SGA babies for self-direction at 3 months of age, expressive language at 6 months of age and fine and gross motor at 9 months of age. However, the disappearance of these differences at 12,18 and 24 months of age is likely due to the optimal nutrition and stimulation given to hese babies**.** Is <2.2kg better than <2.5kg in demonstrating changes in infant development in term SGA? And again, it is yes.

In summary, weight, length and weight for length in healthy children were 0.6 – 0.9 SD lower than WHO-MGRS despite > 90% high adherence to IYCF, implying that WHO-CGS is not appropriate to identify term SGA for Sri Lankan infants. The population specific cutoff at -2SD (3rd centile) for term SGA was 2.2kg according our longitudinal growth curves from birth to 2 years. Changes typical of SGA were better demonstrated with the <2.2 kg than < 2.5 kg with regard to infant development, body composition, anthropometry, placental size as well as cord adipokines and growth factors.

What are the implications for practice?

Use of the <2.5kg cutoff incorrectly diagnose 'normal' Sri Lankan children as term SGA, classify them as high risk, increase burden on health sector and force

catch up growth, increasing the risk of obesity and metabolic syndrome.

What is the burden on the health sector with <2.5 kg cutoff?

Using the 2.5 kg cut off instead of the 2.2kg cut off results in an increased hospital stay, increased burden on nursing care and increased capillary blood sugar monitoring for a minimum of 48 hours, in addition increased multivitamin and iron supplementation and an increased burden on clinic follow up during the first 2 years of life.

Mislabeling SGA with <2.5 kg cutoff, increase parental and midwife anxiety, who in turn attempt to achieve catch up growth and move child's weight from the "orange" / "red" zone into the "green" zone at any cost, resulting in force feeding, and commencing unhealthy foods with sugar and salt as well as formula feeds, which in turn increases the risk of obesity and NCD.

Problems identified included that the WHO-CGS was unsuitable for growth interpretation from birth to 2 years in SL, that the 2.5kg birthweight is not suitable to identify high risk babies at term gestation, trying to push up SGA to 'green' zone in the CHDR and undue parental anxiety caused by the CHDR color scheme and terminology.

Proposed solutions include, the use of population specific growth charts for growth interpretation, as well as the use of population specific -2SD to identify term SGA, i.e., to use <2.2 kg, instead of <2.5 kg, to strengthen awareness programs among the public and health care workers that babies should grow along their birth centile and that trying to push SGA to the "green zone" or above their birth trajectory will increase their risk of obesity and its complications, to use similar colors or remove colors and advocate for growth along the birth trajectory and to remove the alarming terminology used to describe -1SD, -2SD and -3SD.

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Case Report

Familial congenital ulnar drift/windblown hands: *Case report in 4 successive generations*

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Key words: Congenital ulnar drift, windblown hands, ulnar drift

Introduction

Congenital ulnar drift (CUD) of fingers is a rare congenital anomaly consisting of multiple hand deformities that progressively worsens affecting the normal function of hands and causing cosmetically unsatisfactory appearance. This was first described in 1897 by Boix[i] (Boix, 1897).

Although mostly acquired (Rheumatoid arthritis/Jaccourds arthropathy), possible familial type CUD of autosomal dominant inheritance is infrequently reported in literature (Chowdary, 2009).

Here we report on five individuals of four successive generations of a family, with CUD, which to our knowledge is the first such report in the country.

Case presentation

15 days old, term infant presented to the neonatal clinic with B/L symmetrical ulnar drift (UD) of fingers at MCP joints and developing flexion contractures which were tender on palpation. On clinical examination there was no other evidence of skeletal or cardiovascular abnormalities.

X-ray showed B/L ulnar deviation of wrist joints and B/L MCP joints without fractures or subluxation of joints. She was referred for early physiotherapy.

The rest of the affected family members have UD with flexion contractures but function with minimum disturbance to activities of daily living.

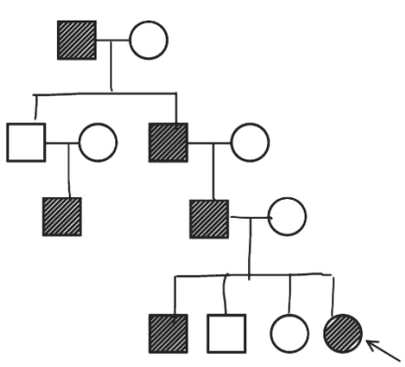

Figure 1: Family's pedigree

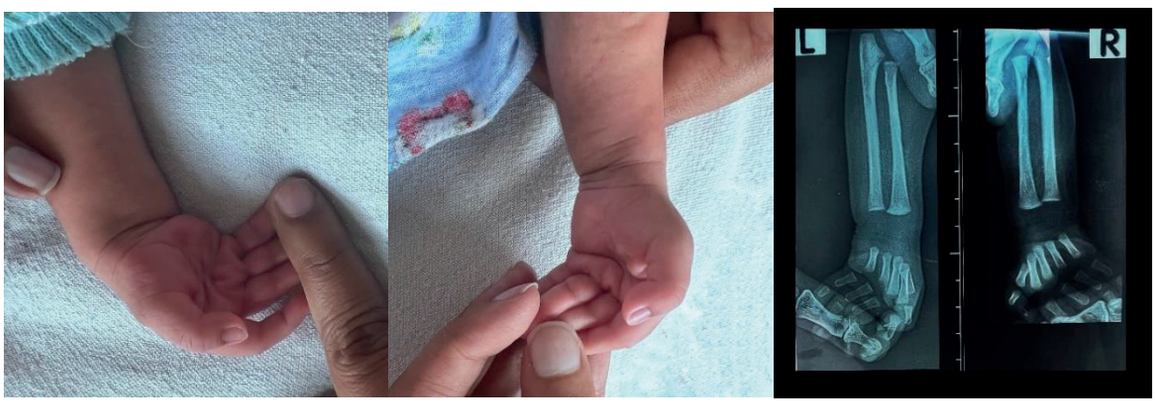

Figure 2: Appearance of the hand of the baby and Radiographic findings

Figure 3: Appearance of the hands of baby's father

Discussion

CUD unlike UD is a rare condition associated with various syndromes; Arthrogryposis, Marfan and other hyperlaxity syndromes, freeman-Sheldon syndrome and Escobar syndrome. Associated craniofacial, foot and other anomalies will be observed in these unlike in our case.

CUD comprises of 3 components; ulnar deviation of digits, MCP joints and PIP joint flexion contractures with clasped thumb deformity.

Insufficiency of aponeurosis (Boix, 1897), hypoplasia / absence of extensor tendons (J.R. Fisk, Jan 1 1974) and malformation of the retinaculum cutis - mid palmar fascia/ natatory ligament (E Zancolli, 1985 Aug) are some pathophysiology suggested for CUD. Severity of CUD vary from mild fasciocutaneous to bony deformities (E Zancolli, 1985 Aug).

Management of CUD could be done non-surgically with splinting or surgically, out of which the second is preferred and benefited if attended before 2-3 years of age. (Virchel E. Wood, 1990) (Kalliainen, 2003)

Even though surgical correction creates near normal anatomical appearance and function, it does not exclude the chances of recurrence, especially when done very early in life. (Chowdary, 2009)

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Published Abstracts

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LONGITUDINAL CURVES FOR NEONATAL BEHAVIOUTAL ASSESSMENT SCORING IN HEALTHY, TERM, INFANTS IN COLOMBO, SRI LANKA

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Introduction

Neonatal Behavioural Assessment Scores (NBAS) at birth reflect the newborns adjustment to labour, delivery and new environment. There is no data regarding NBAS references for healthy Sri Lankan infants.

Objective

To develop longitudinal percentile curves from 1st to 99th centile for NBAS from birth to 2 months, in healthy term infants born in Colombo, Sri Lanka

Methods

Part of a longitudinal study on body composition from July 2015 to December 2019, at Professorial Unit, De Soysa Hospital for Women, Colombo. Term babies born to mothers, >18years old, who agreed, to attend monthly follow-up for one year were enrolled. Assessment was done within 2 days of birth by a single observer certified in NBAS scoring. Ethical clearance was obtained from Faculty of Medicine, University of Colombo. NBAS includes 18reflexes, each scored on a 4-point scale and 28behavioural items each scored on a 9point scale. Data reduction was done using the 7cluster (habituation, orientation, motor, range of state, regulation of state, autonomic stability and reflexes) scoring method. Longitudinal curves were formulated using LMS Chartmaker Pro_version_2.54.

Results

A total of 250 cord blood samples were analysed. Mean and SD for cord blood were 7.3 ± 9.9 ng/ml for leptin, 6.4 ± 5.2 mIU/ml for insulin. 60.6 ± 39.9 ng/ml for IGF-1 and 31.3 ± 14.8 µg /ml for adiponectin. Each ng/ml increase in adiponectin decreased FFM index (FFMI) by 0.1g/cm at 3 months of age [beta=-0.022, p=0.008, r^2=0.074, F(1,91)=7.251, p=0.008] and 0.3g/cm at 9 months of age [beta=-0.027, p=0.013, r^2=0.078, F(1,77)=6.518, p=0.013], each mIU/ml in insulin increased FM by 0.05g at 24 months of age [beta=0.046, p=0.044, r^2=0.125, F(1,31)=4.425, p=0.044] and each ng/ml increase I IGF-1 increased FFMI by 9g/cm at 9 months of age [beta=0.009, p=0.041, r^2=0.053, F(1,77)=4.308, p=0.041].

Conclusion

Cord blood insulin, adiponectin and IGF-1 can be used to predict body composition within the first 2 years of life.

CAN NEONATAL BEHAVIOUTAL ASSESSMENT SCORING PREDICT INFANT BODY COMPOSITION?

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Introduction

Neonatal Behavioural Assessment Scores (NBAS) at birth reflect the newborns adjustment to labour, delivery and new environment. The simplest 2-compartment model of body composition describes our body content as fat mass (FM) and fat free mas (FFM).

Objective

To assess the relationship between NBAS and infant body composition from 3-24 months of age

Methods

Body composition was measured at 3,6,9,12,18 and 24 months via deuterium-dilution-method using saliva sample analysis, in healthy, term babies as part of a longitudinal study from 2015-2019, at Professorial Unit, De Soysa Hospital for Women, Colombo. Assessment was done within 2 days of birth by a single observer certified in NBAS scoring. Ethical clearance was obtained from Faculty of Medicine, University of Colombo. NBAS includes 18reflexes, each scored on a 4-point scale and 28 behavioural items each scored on a 9point scale. Data reduction was done using the 7cluster (habituation, orientation, motor, range of state, regulation of state, autonomic stability and reflexes) scoring method. Data was analysed via SPSS v27 using linear regression, to determine whether NBAS can predict body composition of infants, after ensuring that assumptions of normality, linearity, multicollinearity and homoscedasticity were met.

Results

NBAS assessments were done in 337, 157 and 159 infants at birth, 1 and 2 months of age. Body composition at 3, 6, 12, 18 and 24 months of age was significantly related to NBAS scores at birth, 1 and 2 months of age. State regulation, social interaction, motor system, autonomic system and reflexes demonstrated a significant positive relationship ($p<0.05$) with FM from 3-6 months of age and with FFM from 12-24 months of age while demonstrating a significant negative relationship ($p<0.05$) with FFM from 3-6 months of age and with FM from 12-24 months of age. The positive relationship between FM from 3-6 months of age followed by a positive relationship with FFM from 12-24 months, suggest that NBAS increases parallel to the change in body composition that is characteristic for the breastfed baby with high adherence to infant and young child feeding guidelines.

Conclusion

Increase in NBAS predicts healthy body composition.

ASSESSMENT OF THE ENTERAL FEEDING OF PRETERM BABIES IN NEONATAL INTENSIVE CARE UNIT- TEACHING HOSPITAL MAHAMODARA

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Introduction

Premature infants have greater nutritional needs in the neonatal period and enteral feeding is the preferred method of provision of nutrition. Early and adequate nutritional support is needed to achieve appropriate rates of weight gain and to minimize complications. It is important to choose feeding practices associated with improved outcomes for premature infants. Sometimes parenteral nutrition is needed especially for infants with medical conditions.

Nutritional management in neonatal units often lacks uniformity. Standardization of practice across the neonatal units will minimize the nutrition related complications and improve the neonatal outcomes.

Objectives

To assess the adherence to the standard feeding protocols and to identify the lags of current practice.

Method

Babies who were born preterm (n= 25) from 01.11.2022 – 31.12.2022 were included to the study. Data was collected prospectively using an audit form. Seven standards were defined and assessed in the study. This includes initiation of first feed within 1st 24 hour of life, feeding with breast milk, adherence to the recommended feeding regimes considering risk category of baby, adherence to the appropriate feeding method, assessment of optimal weight gain, commencement of prophylactic Iron treatment and vitamin supplements and antenatal expression of breast milk.

Results

Out of 25, there were 4 extremes preterm, 13 very preterm, 6 moderate preterm and 2 late preterm neonates. According to the birth weight, 7 were less than 1000g, 14 were 1000-1499g and 4 were 1500-2499g.

Out of seven standards, 4 recorded 100% compliance namely feeding with breast milk, adherence to recommended feeding regimes considering risk category, adherence to appropriate feeding method, commencement of prophylactic Iron treatment and vitamins. 92% of babies had optimal weight gain. 64% compliance recorded for initiating 1st feed within 24 hours of birth. Only one baby had received antenatally expressed maternal breast milk.

Conclusion

Although most of the standards are met, there are few areas, which need improvement.

OUTCOMES OF INFANTS BORN LESS THAN 28 WEEKS' GESTATION AND FACTORS ASSOCIATED WITH SURVIVAL AT DISCHARGE: A SINGE CENTER EXPERIENCE IN SRI LANKA OVER A DECADE

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Introduction

Preterm birth and complications are now the leading cause of death globally in children under five years. In Sri Lanka, studies assessing the survival rate of preterm babies and associated factors are sparse.

Methods

This was a 10-year retrospective analysis of all live births at 22+0 to 27+6 weeks gestation in a single center in Sri Lanka. It involved a review of records of all extreme preterm babies admitted between 1st January 2010 and 31st December 2019. Live births with major congenital malformations and chromosomal abnormalities were excluded. Survival probability was calculated by using Kaplan-Meier estimates. Logistic regression was used to assess the factors associated with survival. The explanatory variables included gestational age at birth, comorbidities (sepsis), gender, mode of delivery, and birth weight.

Objectives

To assess the survival of extreme preterm babies and to ascertain factors associated with the survival.

Results

A total of 123 records were reviewed. The majority survived (55.3%). The overall median survival time was 58 days at discharge. Significant independent factors affecting survival were gestational age (B=3.18, 95% CI: 6.239, 92.476, p<0.001 & B=2.83, 95% CI: 4.188, 68.262, p<0.001), small for gestation (B=-1.95, 95% CI: 2.051, 0.392, p=<0.001), and having sepsis (B=-3.19, 95% CI: 0.008, 0.205, p<0.001).

Conclusion

We found a high mortality rate in preterm babies < 28 weeks of gestation and that survival increased with higher gestational age, birth weight, and not having sepsis. Since most of the identified predictors are not modifiable, everyone must work towards improving modifiable risk factors such as prevention of sepsis.

A FACILITY LEVEL QUALITY IMPROVEMNT INITIATIVE CONDCUTED USING THE ASSESSMENT TOOL FOR THE QUALITY OF HOSPITAL CARE FOR MOTHERS AND NEWBORNS: A PILOT PROJECT CONDCUTED AT DSHW

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Introduction

Quality of care provided in labour rooms needs improvement in many LIMC. There is research evidence to prove that systematic use of available tools to identify the gaps and tailor-made interventions can improve the outcomes.

Objectives

To improve the key quality indicators by using the manual developed by the WHO and by training the staff to improve adherence to evidence-based care

Methods

A pilot quasi experimental study conducted in the labour wards of DSHW from May 2021 to Dec 2022. The quality-of-care assessment tool developed by the WHO was used to assess the quality indicators. This audit was conducted over a period of two weeks by a trained doctor. The findings were presented in the stake holders meeting. Areas that need improvement were decided and prioritised. A series of workshops regarding safe use of oxytocin, birth positions, respectful maternity care, intrapartum fetal surveillance, labour companionship and pain relief in labour were conducted and protocols for induction of labour and use of oxytocin, handbook for fetal surveillance, safety checklist for CTG interpretations were developed to improve the adherence to evidence based practices. After one year of implementation phase, a repeat audit was conducted and compared with phase 1.

Results

During the audit and re-audit process, a total of 91 criteria were assessed. Out of these criteria, 30 showed a remarkable improvement of over 50%. Another 40 criteria exhibited an improvement, albeit less than 50%. It is worth noting that 13 of the criteria remained unchanged, with their assessment results remaining static. Interestingly, 12 of these static criteria had already achieved a perfect score of 100% prior to the audit. On the other hand, 8 indicators experienced a decline in their assessment between the audit and the re-audit.

Conclusion

Quality improvement strategy using the assessment tool developed by the WHO and tailor-made interventions to educate and train the staff and development of protocols, checklists and job aids is practical and can be scaled up in similar settings.

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RELATIONSHIP BETWEEN UMBILICAL CORD ARTERIAL PH WITH CTG AND APGAR SCORE

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Key words: cerebral palsy, umbilical cord pH, APGAR score, intrapartum adverse events, electronic fetal monitoring

Introduction

The International Cerebral Palsy (CP) Task Force list four essential criteria for diagnosing CP. One of them is evidence of metabolic acidosis in fetal umbilical cord arterial blood obtained at delivery (pH l <7 and base deficit of ≥12 mmol/L). At UHKDU ward 01 it has been the standard practice to do umbilical artery pH in suspected fetal distress and assisted vaginal deliveries. Electronic fetal monitoring (EFM) and umbilical artery pH are the only means available to confirm objectively any adverse intrapartum event causing CP.

Objectives

To determine the relationship between umbilical cord pH to intrapartum EFM and neonatal APGAR score.

Design

A retrospective correlational study.

Methods

Data collected from bed head tickets (BHT) singleton, term (> 36 weeks gestation), non-anomalous, live neonates with validated paired umbilical cord arterial pH values delivered from January 1st 2023 to May 31st 2023. N=42

Inclusion criteria: Gestational age confirmed by dating ultrasound scan, singleton pregnancy, live birth, EFM of 20minutes or more attached to the BHT, availability of the result of validated umbilical cord blood pH from paired samples.

Results

A Kruskal-Wallis H test showed that there was no statistically significant difference in umbilical Ph between the different intrapartum CTG findings, $\chi 2(2) = 2.301$, $p = 0.316$, with a mean rank umbilical Ph of 18.05 for normal CTG, 20.94 for suspicious CTG and 13.42 for pathological CTG.

The relationship between umbilical cord Ph and APGAR score was investigated using Spearman's rank order correlation. There was a medium, positive correlation between the two variables [r=42, n=42, p<.0005], with high levels of umbilical cord Ph associated with high levels of APGAR score.

Conclusions

Intrapartum CTG has no statistically significant correlation to umbilical artery Ph. A statistically significant positive correlation between the two variables APGAR score to umbilical artery Ph was found.

STREPTOCOCCAL NEONATAL DISEASE: A SINGLE TERTIARY CARE CENTER EXPERIENCE BETWEEN PRE AND POST IMPLEMENTATION OF THE NATIONAL GUIDELINES TO MITIGATE GROUP B NEONATAL SEPSIS

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Introduction

Group B Streptococcus (GBS) and other streptococcal species cause neonatal sepsis with variable severity. GBS sepsis result in mortality of 10% and 50 % of survivors develop neuro-disability in various severity. The country implemented national guideline to mitigate GBS sepsis in 2016, in keeping with the NICE guidelines.

Objectives

The study assesses the changes that occurred in the prevalence of GBS neonatal sepsis over a decade to evaluate the impact of GBS prophylaxis. The study also aims to provide the baseline data for a national surveillance on GBS neonatal disease.

Method

A retrospective descriptive analysis was done on all streptococcal isolates recovered from the blood cultures collected from neonates, managed at Colombo South Teaching Hospital over a period of 10 years from the 1st of January 2013. The data was collated from the data retained in the Microbiology laboratory and in the special care baby unit (SCBU).

Results

Fifty episodes of GBS, 3 pneumococcal, and 3 *Streptococcus pyogenes* neonatal sepsis were reported. The incidences of GBS sepsis were 0.66, 0.86, 0.9, 0.93, 1.33, 0.61, 0.25, 2.27 per 1000 live births respectively from 2015 to 2022. Forty-four (96%) were early onset sepsis (EOS) and all (40/50) were delivered vaginally or by an emergency section. Forty-six (92%) newborns with GBS sepsis needed care from the SCBU and the reported mortality rate was 7% (3/42). Pneumococcus was isolated as a pathogen of early onset sepsis from 3 and 2 (67%) of them died, although the isolates were susceptible to cefotaxime.

Conclusion

No significant downward trend noted in GBS-EOS following implementation of GBS prevention guidelines, indicating the need for reassessing the existing practises and looking for new strategies. The incidence of GBS sepsis in the present study is similar to the incidence of high-income countries with comparatively higher mortality rate. Therefore, the study shows the importance of a national surveillance on GBS sepsis to define the burden of disease. *S. pneumoniae*, a rare pathogen in EOS which carries a high mortality probably due to lack of maternal antibodies since the vaccine is not implemented in Sri Lanka.

AUDIT ON EARLY ONSET NEONATAL SEPSIS (EOS) AT BASE HOSPITAL UDUGAMA

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Keywords: Early onset Neonatal Sepsis, Intrapartum care

Introduction

Neonatal sepsis may be categorized as early (<72 hours) or late onset. In Sri Lanka 11% of Neonatal mortality is due to infection, among whome 75% deaths occur during the first week due to EOS.

Decreasing invasive interventions and promoting hygenic practises are key preventive strategies to avoid EOS.

Objective

To audit and reduce early onset neonatal infections

Methods

We conducted a retrospective cross-sectional study of all deliveries over two consecutive months at maternity unit of Base Hospital Udugama, Sri Lanka. Using a pretested checklist and compared against national guideline for newborn care (Ministry of Health ; 2020).

Result

Hundred and five deliveries were studied during months of January and February, 2023. The median maternal age was 30 years while median gestational age of neonates was 37 weeks + 5 days.

Early onset neonatal infection (EOS) rate was found to be 3.8%(N=4) in this population. Preterm labour (<37 weeks) 36.1%(N=38), newborn of a mother with diabetes 9.5%(N=10), Instrumental/ Difficult delivery 4.7%(N=5), >3 Vaginal Examinations 25.7%(N=27), PROM >18 hours 0.9%(N=1), Low birth weight <10th Centile 6.6%(N=7) and low APGAR at 5 min 1.9%(N=2) were the documented risk factors for EOS.

Conclusion and Recommendation

Sri Lankan national guideline for newborn care states maternal pyrexia, PPROM/ Prolonged rupture of membranes >18 hours, Preterm delivery, Low birth weight, Low APGAR, difficult delivery/instrumentation, ≥3 vaginal examinations or unclean delivery ect. as risk factors for EOS.

However, in this population, only newborn of a mother with diabetes was the only factor which was associated with EOS.

To mitigate the early onset neonatal infection, we have newly implemented quality improvement measures namely, limiting number of vaginal examinations, strict asepsis during vaginal examinations, limiting number of visitors by introducing a visitors pass system, regular carbolizing, changing linen and individual allocation linen for each baby. Proper diabetic control has been achieved by home blood sugar monitoring.

At present follow-up audit is being carried out following new hygienic practises.

ASSESS THE ADHERENCE TO THE GOLDEN HOUR CONCEPT IN MANAGEMENT OF PREMATURE BABIES AT TEACHING HOSPITAL MAHAMODARA.

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Introduction

"Golden hour" of the neonatal life is defined as the first hour of postnatal life in both preterm and term neonates. This includes neonatal resuscitation, post resuscitation care, transportation of sick neonate to NICU, cardiovascular support, respiratory support and initial stabilization in NICU. Golden hour concept includes practicing evidence-based interventions during the first hour of stabilization of a neonate. This practice has markedly reduced the neonatal hypothermia, hypoglycemia, intraventricular hemorrhage, bronchopulmonary dysplasia and retinopathy of prematurity.

There are many standard interventions that need to be practiced during the golden hour for optimal neonatal care. This study aims to assess the adherence to these concepts.

Objectives

To assess the adherence to standard interventions during the golden hour.

Methodology

Observational Prospective study was conducted in the NICU- THM from 20/8/2022 to 30/11/2022. Babies who were less than 34 weeks of gestation were included to the study. Optimal cord management, prevention of hypothermia, surfactant treatment and respiratory support, cardiovascular support, laboratory investigations, commencement of intravenous fluids/ parenteral nutrition and antibiotics was assessed during the study.

Results

Total of 43 premature babies were assessed during this period. All the babies had immediate cord clamping. All the babies who were less than 32 weeks of gestation delivered into the plastic bag and monitored for hypothermia. Out of 43 babies 24 babies were normothermic on admission to NICU. 16 (37.2%) babies were mildly hypothermic. Three babies (6.9%) had moderate hypothermia. All the babies were stabilized on PEEP at delivery room and admitted to NICU during the golden hour to receive the respiratory care. Out of 43 only 6 babies met the criteria and received the Surfactant treatment. Screening for hypoglycemia was done only in 28 babies (65%) and 8 (28.5%) babies had hypoglycemia. All the babies had initial blood investigations during the golden hour and had intravenous fluids and antibiotics when indicated.

Conclusions

The concept of "Golden hour" is for the better outcome of neonates and this study shows that there are few areas which need improvement.

AUDIT CYCLE ON IMPLEMENTATION OF BEST PRACTICE IN BASIC NEONATAL RESUSCITATION GUIDELINES IN MATERNITY UNITS AND MATERNITY THEATER

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Introduction

Resuscitation council in United Kingdom have introduced guidelines for improving the quality of neonatal care. Evidence have proven that adherence to formulated guidelines is a highly effective intervention that can reduce the incidence of severe birth asphyxia and hypoxic injury of the neonates, mainly in developing countries.

Objectives

Audit project was focused to evaluate the current practice of neonatal resuscitation in labour ward and maternity theatre at Colombo North Teaching Hospital Ragama against the European resuscitation guidelines.

Methods

91 participants including 63 nurses and 28 midwives specialized in providing labour care were audited. Audit was carried out collecting clinical data on the proper assessment of the APGAR score according to retrospective case note reviews of 245 babies. A questionnaire and observer check list was used to collect data on practices.

Baseline audit data were analysed using simple statistical data analysis. An action plan was developed following identifying the potential barriers to adhere guidelines with interactive teaching and skills sessions being implemented over a period of 1 month with suppression of the audit leads.

A prospective re-audit was carried out among the same study subjects and assessed 240 babies in a similar manner.

Results

Baseline audit revealed that only 12% of subjects have undergone a training course on neonatal resuscitation previously. 5 out of 31 necessary equipment were not available (Laryngoscope, face masks were not available in three different sizes). Appropriate documentation of APGAR score was 97%. Awareness of guidelines and protocols was 25% without meeting 100% adherence to the standards. Resistance to change practice, knowledge gaps and lack of motivation for training were identified as barriers for adherence and addressed successfully at action plan which included Neonatal resuscitation workshops. During re-audit, APGAR score documentation and equipment maintenance was 100%. Staff satisfaction and guideline adherence were 100% following knowledge sharing. Will to change practices and to attend training sessions showed a significant improvement (70% and 88% respectively).

Conclusion

Audit cycle addressed the barriers to adhere guidelines and helped ensuring confidence, establishing proper skills and techniques among new-born care providers thus leading to a remarkable outcome.

SURVEY ON MUSCULOSKELETAL SYMPTOMS IN A GROUP OF OBSTETRIC PATIENTS AT A DISTRICT HOSPITAL IN SRI LANKA

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Introduction

Musculoskeletal symptoms are frequently reported by pregnant women and can have a significant impact on their daily functioning and quality of life. However, limited attention has been given to exploring the prevalence of musculoskeletal symptoms specifically in obstetric patients within rural healthcare settings. This survey aims to fill this crucial knowledge from a rheumatology perspective.

Objectives

Provide insights from a rheumatology perspective on musculoskeletal symptom prevalence and associated factors in obstetric patients in rural healthcare settings. Contribute to the development of targeted interventions and management strategies to improve the well-being of obstetric patients.

Methodology

The survey was conducted among 65 obstetric patients who were either attending clinics or warded at the obstetric wards at Matara District General Hospital using an interviewer-based questionnaire. Statistical analysis was done using SPSS.

Results

Median(IQR) age of the study population was 30(26-33)years. Median(IQR) gestational age was 32(20-36) weeks. Mean(SD) parity was 2.05(4.533). Common types of musculoskeletal symptoms were back, leg and knee pain seen in 48.5%, 19.7% and 4.5% of patients respectively.

Some reasons attributed by patients as possible causes of pain were nutritional deficiencies(83.1%), caring for new-born(80%), weight-gain(76.9%), changes in posture(76.9%) and childbirth injuries(72.3%).

The age of patient positively correlated with hours of physical activity carried out on a daily basis($p<0.01$). Patients with higher parity had onset of musculoskeletal symptoms at a later gestational age($p<0.01$). Severity of symptoms plotted in a visual analogue scale was worse if number of months since last childbirth was higher($p<0.05$), when gestational age at onset of symptoms was higher($p<0.01$) or when the hours of daily physical activity was higher($p<0.05$). Higher gestational age positively correlated with a higher gestational age of onset of symptoms($P<0.01$).

Conclusion

Musculoskeletal pain was reported in various body regions, with age, parity, gestational age and physical activity playing significant roles in the onset and severity of symptoms. These findings emphasize the importance of addressing musculoskeletal symptoms in obstetric patients. Further research and interventions are warranted to better understand and manage symptoms in this population.

PREGNANT WOMENS' ATTITUDES TOWARDS DECISION-MAKING AND IMPLEMENTING NIPT IN NATIONAL ANTENATAL CARE

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Introduction

NIPT has become an integral part of fetal medicine. Though national program for antenatal care doesn't have a considerable place for this testing, it is available in private sector laboratories.

Objectives

Evaluate the attitudes of pregnant women in Sri Lanka towards implementing NIPT in national antenatal care plan for high risk pregnancies.

Methodology

Pregnant women, attending the Fetal medicine clinic, Professorial Obstetrics and Gynecology Unit, North Colombo Teaching Hospital, Ragama, and Fetal medicine unit, Ninewells Care Mother & Baby Hospital (PVT) Ltd, Kirimandala Mawatha, Narahenpita were recruited to the study. Data collection was done through interviewer based questionnaire, in three aspects (social and demographic data, attitude towards NIPT, and factors important for decision-making for NIPT testing) following educating the each pregnant mother regarding NIPT and clarifying their problems

Results

A total of 179, 60 patients were enlisted from the NCTH, and 119 patients were from the Ninewells hospital. 82 (46%) mothers had a high-risk pregnancies. There were 10 (5.5%) mothers who had a past history of Down syndrome/congenitally abnormal children. Only 32 (8%) mothers knew that NIPT is available in Sri Lanka while majority.

Seventy (39%) mothers strongly agreed that NIPT should be offered to all high risk pregnancies, 13(7%) mothers strongly disagreed with the decision. The majority (141; 79%) of the cohort agreed with the decision to undergo invasive prenatal testing if they got positive NIPT and 23 (13%) disagreed with that choice.

The most important factor in undertaking NIPT testing was to know more information about the fetus. 173 (97%) mothers considered doing the NIPT testing because they were more worried about the baby's safety. The least important factor for decision-making to undergo NIPT was to confirm the gender of the baby (50, 28%). The family support (71%) and social support(71%) of having a baby with a chromosomal abnormality and 148 (83%) mothers considered the fear of not being able to cope with a baby with a chromosomal abnormality to be important in decision-making.

Conclusion

The majority (147; 82%) of the study cohort needs to be made aware about this test and the availability of NIPT.

KNOWLEDGE OF PREGNANT MOTHERS ON PHARMACOLOGICAL & NON PHARMACOLOGICAL METHODS OF PAIN MANAGEMENT DURING VAGINAL DELIVERY IN DISTRICT GENERAL HOSPITAL, HORANA.

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Introduction

Normal vaginal delivery is associated with negative emotions due to experience of severe pain. Labour pain is mostly ignored in low-income countries.

Objectives

To assess the knowledge of pregnant mothers regarding the pharmacological pain management (PPM) and non-pharmacological pain management (NPPM) methods during vaginal delivery in DGH, Horana.

Methods

A descriptive cross sectional study was conducted at antenatal clinics of DGH, Horana from 31/05/2023 to 15/06/2023. 100 pregnant mothers participated to the study. Participants verbally responded to invigilator administered pre designed questionnaire after informed consent.

Results

Most participants had studied up to Ordinary Level 61(61%) and were not employed 78(78%). 87(87%) reported they accept any kind of labour analgeisa during labour while 13(13%) said not required. Regarding pain management, 16(16%) mothers knew only PPM methods, 6(6%) only NPPM methods, 68(68%) knew both methods and 10(10%) mothers did not know any method. Considering the knowledge of NPPM methods 41(54.6%) knew breathing exercises, 47(62.6%) walking/upright, 51(67.1%) massage, 17(22.6%) aroma therapy, 43(57.3%) pray and 31(41.3%) focus on interesting picture. Only 24(24%) had heard about NPPM methods, but they didn't know exact methods. Knowledge on available PPM methods for pain relief were 12(12%) oral, 14(14%) injections, 49(49%) both methods and 25(25%) didn't know any method. There was a correlation with the multiple gestation and the knowledge on PPM methods (P=0.001).

Conclusion

Knowledge of pregnant mothers on PPM methods is more compared to NPPM methods.
Improvements in practice of NPPM techniques is required while educating pharmacological methods, to undergo pain free labour.

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