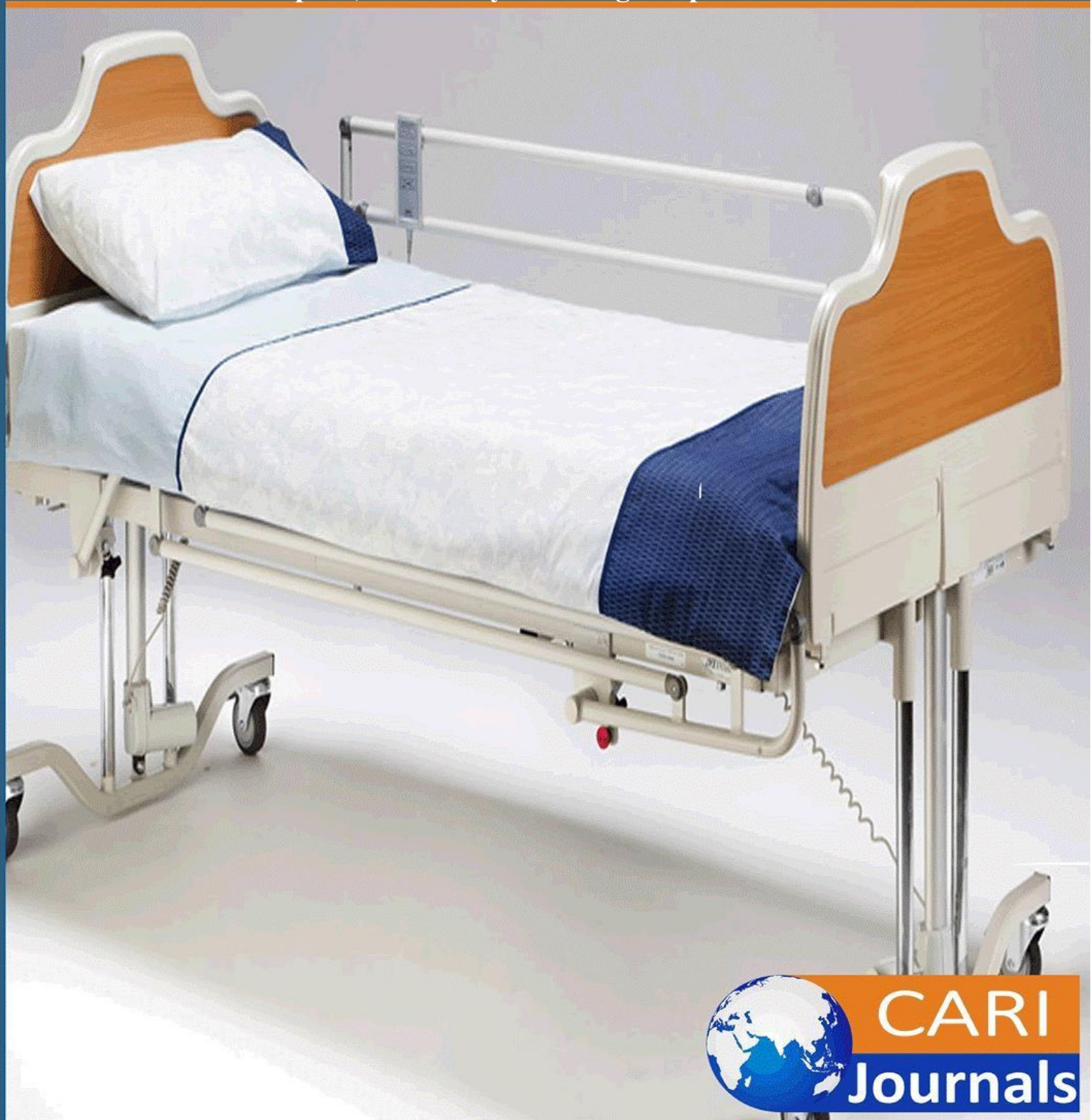
International Journal of
Health, Medicine and Nursing Practice
(IJHMNP)

Seizures in Asphyxiated Term Newborns Based on Admission Thompson Score at the Women and Newborn Hospital, University Teaching Hospitals in Lusaka.



CARI Journals

International Journal of Health, Medicine and Nursing Practice
ISSN 2710-1150 (Online)
Vol.6, Issue No.5, pp 54 - 62, 2024
www.carijournals.org

Seizures in Asphyxiated Term Newborns Based on Admission Thompson Score at the Women and Newborn Hospital, University Teaching Hospitals in Lusaka, Zambia.

[1*] Masuzyo Kondowe, [2] Brenda Sianchapa, [3] Priscar Sakala

[1*] University of Zambia, Master of Science in Neonatal Nursing School of Nursing Sciences

[2] University of Zambia, Lecturer, School of Nursing Sciences

[3] Lusaka College of Nursing and Midwifery, Head of College

Accepted: 16th Apr 2024 Received in Revised Form: 16th May 2024 Published: 16th Jun 2024

Abstract

Purpose: The main purpose of the study was to investigate seizures in asphyxiated term neonates based on the admission Thompson score at the University of Zambia, Women and New-born Neonatal Intensive Care Unit.

Methodology: A cross-sectional descriptive study design was used to conduct the study between (May 2022 to April 2023) in the Neonatal Intensive Care Unit (NICU) at the University Teaching Hospital for Women and Newborns in Lusaka Zambia. Stratified sampling was used to collect 217 files of neonates born at the tertiary facility as well as those referred from other centres with Apgar scores of ≤ 7 at one and five minutes of life. A structured questionnaire was used to collect data from medical records, the Thompson score (TS) was assessed on admission and details of neonatal seizures were analyzed using chi-square, fisher's exact test and multivariable logistic regression.

Findings: On admission, TS assessment was conducted on all 217 neonates of which 169 (77.9 %) neonates were classified with mild HIE,45 (20.9 %) moderate and 3(1.4 %) with severe HIE. Most neonates (77.4%) presented with seizures on admission. Results of the chi-square and fisher's exact tests showed that Thompson's score on admission was significantly associated with seizure occurrence (p=0.001). On multivariable binary logistic regression neonates with moderate HIE had over 10 times more odds of seizure occurrence compared to neonates with a mild HIE score (aOR=10.6, CI=2.32, 48.1, p=0.002).

A unique contribution to theory, practice, and policy: The study concluded that seizures were present in all categories of HIE, the majority of who were classified with moderate HIE based on the Thompson score. Therefore, improving the quality of intrapartum care at the Women and Newborn Hospital can significantly reduce the occurrence of asphyxia and its complication.

Keywords: *Neonatal, Seizures, Thompson Score, Hypoxic Ischemic Encephalopathy (HIE)*

1.0 BACKGROUND INFORMATION

Birth asphyxia is one of the major causes of mortality and morbidity particularly in the first week of life. According to (Krakauer et al., 2023), asphyxia is a lack of blood flow or gas exchange to or from the fetus in the period immediately before, during, or after the birth process. Globally, birth asphyxia is one of the leading causes of early neonatal mortality, a report by WHO in 2020 revealed that in 2017 close to 2.5 million children died in the first month of life, accounting for 47% of all under-five child deaths. In the sub-Saharan region to which Zambia belongs the prevalence rate ranges between (21.3 to 56.9%) (Tadesse et al., 2022). According to the Zambia Demographic Health Survey (ZDHS, 2018), asphyxia was recorded as a significant contributor to the early neonatal mortality rate estimated at 27/1000 live births. Although birth asphyxia is caused by preventable causes, the number of neonates admitted to the Women and Newborn Hospital (WNBH), NICU continues to be alarming. A review of NICU records showed a monthly average admission of 450 newborns out of which 100 were cases of birth asphyxia. Although the majority of neonates recover quickly following post-asphyxiation, a proportion progress to Hypoxic ischemic encephalopathy (HIE) (Ahearne et al, 2016). In the absence of electroencephalography (EEG), the neurological status of asphyxiated neonates is evaluated using the Thompson score (TS). Several scholars have asserted that the tool is highly predictive of neonatal outcomes. Thus, can be used to identify neonates at risk of poor neurodevelopmental outcomes (Mwakyusa et al, 2009). The purpose of the study was to investigate neonatal seizures in asphyxiated neonates based on admission Thompson scoring among term neonates admitted to NICU at the WNBN, Lusaka Zambia.

2.0 METHODOLOGY

2.1RESEARH DESIGN

A quantitative descriptive cross-sectional design was used to review records of asphyxiated neonates admitted to the neonatal unit between the periods (May 2022 to April 2023).

2.2 STUDY SETTING

The study was conducted at the Neonatal Intensive Care Unit (NICU) at the University Teaching Hospital in Lusaka, Zambia (UTH). The tertiary hospital provides specialized care to premature and sick neonates in the first 28 days of life countrywide.

2.3 DATA COLLECTION INSTRUMENT

A structured questionnaire was adapted and modified from Kenyatta National Hospital with Cronbach's alpha value of 0.89 on internal consistency guided the collection of information from patients' records.

2.4 STUDY POPULATION

The study included all asphyxiated with a gestational age equal to or greater than 37 weeks admitted to NICU.

2.5 DATA COLLECTION AND ANALYSIS

A structured questionnaire was used to collect information from patients' records which was coded and analyzed using Statistical Package for Social Sciences (SPSS) version 26. The study was conducted at a significance level set at 5% and a confidence level of 95%. The chi-square, fisher exact test and multivariable logistic regression were used to determine the relationship between the dependent variable and independent variable.

3.0 RESULTS

3.1 PARTICIPANTS DEMOGRAPHIC CHARACTERISTICS

A large proportion of neonatal mothers, 169 (77.9%) were aged 18–35 years,131 (60.4%) were primigravida, from peri-urban areas 149 (68.7%). Twenty-one (9.5%) mothers were reported to have had intrapartum risks, with foetal distress being the most documented 7 (33.3%). The majority, 191 (88%) attended antenatal care at least once during pregnancy.

Table 1: Maternal socio-demographic characteristics (n=217)

Characteristic	Levels	Frequency (n)	Percent (%)
Age	Under 18 years	24	11.1
	18 – 35 years	169	77.9
	Over 35 years	24	11.1
Parity	Primigravida	131	60.4
	Multigravida	86	39.6
Area of residence	Urban	63	29.0
	Peri-urban	149	68.7
	Rural	5	2.3
HIV status	Positive	23	10.6
	Negative	163	75.1
	Unknown	31	14.3
History of intrapartum risk factors	Yes	21	9.7
	No	196	90.3
Specific intrapartum risk factors	Big baby	2	9.5
	Cord prolapse	3	14.3
	CPD	3	14.3
	Foetal distress	7	33.3
	PIH	1	4.8
	Placenta abruption	1	4.8
Attended antenatal care	Yes	191	88.0
	No	26	12.0

3.2 Neonatal characteristics (n=217)

Under 20 percent, 41 (18.9%) were delivered via caesarean section, with foetal distress being the most common indication 12 (29.3%) for delivery. About half, 112 (51.6%) had a birthweight of

2.5–3kg, and 209 (96.3%) were born between 37–41 weeks gestation. Most neonates, 159 (73.7%) were admitted within six hours of birth, with males accounting for over half of the neonates in the study 117 (53.9%).

Characteristic	Levels	Frequency (n)	Percent (%)
Age at admission	> 6 hours	58	26.7
	≤ 6 hours	159	73.7
Sex	Female	100	46.1
	Male	117	53.9
Place of birth	WNH	43	19.8
	Elsewhere	174	80.2
Duration admitted	1–3 days	44	20.4
	4–7 days	92	42.6
	> 7 days	80	37.0
Mode of delivery	Cesarean	41	18.9
	Vaginal	176	81.1
Caesarean indication	Breech presentation	2	4.9
	CPD	4	9.8
	Cord prolapse	3	7.3
	Fetal distress	12	29.3
	Previous scar	1	2.4
	Prolonged labour	4	9.8
	pre-eclampsia	1	2.4
	Undocumented	14	34.2
	Breech presentation	2	4.9
Birth weight	2.5–3kg	112	51.6
	3.1 – 3.99kg	97	44.7
	> 3.99kg	8	3.7
Gestation age at delivery	37–41 weeks	209	96.3
	Over 41 weeks	8	3.7

Table 2: Neonatal socio-demographic characteristics

3.3NEONATAL CLINICAL CHARACTERISTIC

Of the neonates, 169 (77.9%) had a mild HIE score on admission, while 45 (20.7%) had a moderate HIE score. Thompson scoring was mostly conducted within 6 hours of admission, in 179 (82.9%). The majority 192 (88.5%) required resuscitation at birth, bag and mask ventilation being the most documented in 181 (85.8 %) of admissions.

Table 3: Neonatal clinical characteristics (n=217)

Characteristic	Levels	Frequency (n)	Percent (%)
Thompson score assessed on admission	Yes	217	100
Thompson classification on admission	Mild HIE	169	77.9
	Moderate HIE	45	20.7
	Severe HIE	3	1.4
Scoring conducted before six hours of age	No	37	17.1
	Yes	179	82.9
Required resuscitation at birth	No	25	11.5
	Yes	192	88.5
Required resuscitation by bag and mask	No	30	14.2
	Yes	181	85.8
Required advanced resuscitation	No	203	96.7
	Yes	7	3.3

HIE *= Hypoxic Ischemic Encephalopathy*

3. 4 Characteristics of seizures among neonates (n=217)

Most of the neonates, 168 (77.4%) presented with seizures on admission, majority of seizures, 164 (97.6%) occurred in the first 24 hours of birth. At the time of seizures, most, 119 (73%) neonates had moderate HIE.

3.5 THOMPSON SCORE AND RISK FACTORS ASSOCIATED WITH NEONATAL SEIZURES

Multivariable analysis showed that controlling for other variables, the effect of the Thompson score was that neonates with a moderate HIE score had over 10 times more odds of seizure occurrence compared to neonates with a mild HIE score (aOR=10.6, CI=2.32, 48.1, p=0.002)Neonates admitted for over 7 days versus 1–3 days (aOR=8.59, CI=2.75, 26.8, p<0.0001), and those born from mothers who attended antenatal care versus those who did not (aOR=3.10, CI=1.12, 8.63, p=0.030) had increased odds of seizure occurrence. On the other hand, neonates from mothers with a history of intrapartum complications (aOR=0.27, CI=0.09, 0.87, p=0.028) and mothers with an unknown HIV status (aOR=0.26, CI=0.10, 0.69, p=0.007) had reduced odds of seizure occurrence.

4.0 DISCUSSION OF FINDINGS

4.1 CHARACTERISTICS OF THE STUDY SAMPLE

Table 2 shows an almost equal distribution of enrolled male and female neonates. The majority of the neonates (174) 80.2% were born at the tertiary facility. Probably because it is the largest tertiary facility receiving and managing obstetric emergencies countrywide. A total of 192(88.5%) were resuscitated and TS assessment was conducted within 6 hours of admission in 179 (82.9%) of the neonates. Findings are similar to a study in Congo DRC (Biselele et al., 2013) in which the TS was not obtained within 6 hours in all neonates. This could be due to late referral to NICU following asphyxiation at birth.

4.2 CHARACTERISTICS OF SEIZURES

The study established that neonatal seizures (77.4%) were a common outcome among the neonates (97.6%) which were observed within 24 hours of birth. Findings of a study conducted by (Gayathri et al,2018) in India reported lower seizures (15%) occurring within 72 hours of birth. In the current study, seizures were observed in all categories of HIE, these findings are consistent with (Mwakyusa et al., 2009)

4.3 FACTORS ASSOCIATED WITH SEIZURES

The study findings showed that ANC, intrapartum risk, mode of delivery, status and the Thompson score were statistically significant. The majority (88%) of neonatal mothers attended at least one ANC visit, indicating poor attendance of follow-up visits. In contrast, a study in Rwanda reported that although neonatal mothers attended more than four visits, birth asphyxia was still reported in (45.5%). This suggests that intrapartum risk could occur regardless of the number of Anc visits attended.The majority of the neonates (81.2%) reported to have had seizures were born through spontaneous vaginal delivery. Similarly (Dickmark et al,2022) reported increased seizure occurrence among neonates born vaginally. This may be due to delayed second stage and poor resuscitation skills at birth resulting in delayed oxygenation and poor tissue perfusion.

In this study, foetal distress (33.3%) was the most documented intrapartum risk factor, possibly due to delayed interventions by obstetricians. Likewise, a study in Cameroon revealed that neonates with foetal distress had a higher likelihood of developing asphyxia and its complications. (Puepi et al,2022)

The Thompson score on admission was found to be significantly associated with seizures occurrence. Our study had a higher seizure occurrence rate of (77.4%), while another study conducted in Tanzania reported a lower rate (41.7%) of seizure in the first week of life (Mwakyusa,2009) This difference may be attributed to the fact that in our setting delayed referral and poor quality of care post asphyxiation result in poorly controlled or recurrent seizures.

On multivariable regressions, neonates with moderate HIE scores had over 10 times more odds of seizure occurrence compared to neonates with a mild HIE score (aOR=10.6, CI=2.32, 48.1, p=0.002). This is similar to other studies that reported the majority of seizures in the moderate and severe classification of HIE. In this study, the lower percentage of seizures in severe HIE could be due to possible sedation at the time of evaluation.

5.0 CONCLUSION

Neonatal seizures were a common short-term outcome identified among neonates admitted to the NICU. Furthermore, findings suggested that neonatal seizures were presented in all categories of HIE, however worsened with increasing Thompson Score

6.0 RECOMMENDATION

1. Ministry of Health (MoH) through health promotion to strengthen the sensitization of mothers and communities on the need to access focused ANC services to facilitate the identification of

risk factors early in pregnancy and ensure timely medical interventions to prevent birth asphyxia and its complications.

2. MoH to strengthen the policy on the close monitoring and early medical interventions during labour and delivery to reduce the occurrence of birth asphyxia and its complications.
3. Given the short-term outcomes, there is a need for MOH to formulate a policy that ensures that staff in delivery institutions have formal training on neonatal resuscitation to reduce the burden of neonatal asphyxia.
4. The is a need for MOH to standardize and disseminate guidelines on the immediate care of birth asphyxia to reduce variations in the care of neonates post-asphyxiation countrywide.

7.0 REFERENCE

Ahearne, C.E, Boylan, G.B, Murray, D.M. (2016) ***Short- and long-term prognosis in perinatal asphyxia:*** An update https://www.wjgnet.com/2219-2808/full/v5/il/67

Bhagwani, D.K, Manisha S, Kothapalli, S. (2016) *To study the correlation of Thompson Scoring in Predicting Early Neonatal Outcomes in Post asphyxiated Term Neonates https://www.ncbi.nlm.nih.gov*

Bhutta, Z, A. (2014) *Paediatrics in the Tropics, Manson tropical infectious diseases* https://ncbi.nlm.nih.gov

Biselele, T. Naulaers, G. Muntu, P, B. Nkidiaka E., et al (2013) *A Descriptive Study of Perinatal Asphyxia at the University Hospital of Kinshasa* (Democratic Republic of Congo. Journal of Tropical Paediatrics.

Dickmark M, Ågren J, Hellström-Westas L, Jonsson M. (2022) *Risk factors for seizures in the vigorous term neonate***:** A population-based register study of singleton births in Sweden. PLoS One. 2022 Feb 17;17(2): e0264117. doi: 10.1371/journal.pone.0264117. PMID: 35176121; PMCID: PMC8853521 https:// www.ncbi.nlm.nih.gov>

Gannon, H, Chimhini, G, Cortina-Borja M, Chiyaka, T, Mangiza, M. et al (2022) *Risk factors of mortality in neonates with neonatal encephalopathy in a tertiary newborn care unit in Zimbabwe over a 12-month period. https://pubmed.ncbi.nlm.nih.gov*

Gayathri,K. & Ashraf.T.P (2018) Immediate neurological outcome of term babies with perinatal asphyxia in a tertiary level Care Centre in Kerala .Journal of medical Science and Clinical Research volume 6 issue 10th October 2018
DOI:https://dx.doi.org/10.18535/jmscr/v6i10.193

Gillam-Krakauer, M., Gowen, Jr C.W. (2023) Birth Asphyxia. In: Stat Pearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK430782/

Maalim, A, M. (2011) *Short Term Outcomes of Term Neonates Admitted with Perinatal Asphyxia in Kenyatta National Hospital Newborn Unit*, Department Of Paediatric & Child Health, University Of Nairobi https://www.ncbi.nlm.nih.gov>

Madara, C, W. (2019) *Short term outcome of asphyxia in preterm neonates receiving care at newborn unit, Kenyatta Hospital*, School of nursing, University of Nairobi.https://www.erepoitory.uonbi.ac.ke>

Mwakyusa, S.D, Manji, K.P, Massawe, A.W, (2009) *The hypoxic Ischaemic Encephalopathy Score in predicting Neurodevelopmental outcomes Among infants with Birth Asphyxia at Muhimbili National Hospital Dar-es-Salaam Tanzania*, Journal of tropical Paediatrics https://doi.org/10.1093/tropej/fmn061 .

Namusoke, H., Nannyonga, M., Mworozi, E. (2018) *Incidence and Short- term Outcomes of Neonates with Hypoxic Ischemic Encephalopathy in Peri -Urban Teaching Hospital, Uganda: A prospective cohort study.* https://www.ncbi.nlm.nih.gov

Puepi, Y.D., Mohaman, A., Simo A.G, Wandji, Y, Monono N, et al (2022) **"***Prevalence, Associated Factors and Outcomes of Neonatal Asphyxia amongst Term Neonates in Ngaoundere*", Health Sciences and Disease, 23(11). Doi: 10.5281/Hsd.V23i11.3990 https://www.hsd-fmsb.org>

Simiyu, I. N., Mchaile, D.N., Katsongeri K, Philemon, R.N, Msuya, S.E. (2017). *Prevalence, severity and early outcomes of hypoxic ischemic encephalopathy among newborns at a tertiary hospital in northern Tanzania. Bmcpediatr.biomedcentral.com* ***https://pubmed.ncbi.nlm.nih.gov***

Tadesse, A.W, Mulune, M.D, Aychiluhm, S, B. et al (2022) *Determinants of birth asphyxia among preterm newborns in Ethiopia. A systematic review and meta-analysis of observational studies protocol. https://pubmed.ncbi.nlm.nih.gov*>

Uwingabire, F. & Gowan, M. (2019) Birth asphyxia at a district hospital in Kigali,Rwanda, Rwanda Journal of Medicine and Health Sciences https://www.ajol.info/index.php/rjmhs/article/view/186880

World Health Organization (2019) New-born: **Reducing mortality**. available at: https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality. accessed in 2020

Yelemali, B., Ramesh, P., Talawar, K.B., Sanjay, N., Badakali, A. (2014) *Outcomes of newborns with birth asphyxia in tertiary hospital a retrospective study.* https://www.researchgate.net>

Zambia Statistics Agency, Ministry of Health Zambia, (2018) Zambia Demographic and Health Survey Summary Report, Lusaka.