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Prevalence Risk Factors and Early Outcome of Hypoglycemia in Neonates Born at Mwananyamala and Kairuki Hospitals Dar es Salaam Tanzania

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Abstract: ***Introduction: Neonatal hypoglycemia may not be detected unless routine measurements of glucose level are undertaken in all newborn babies in a particular hospital, due to the fact that many neonates may present with asymptomatic hypoglycemia. The aim of this study was to determine precisely at what time after delivery neonates develop hypoglycemia. Objective: The broad objective of the study was to determine the prevalence, risk factors and early outcome of hypoglycemia among neonates born in two health facilities in Dar Es Salaam, Tanzania. Methodology: This was a descriptive cross - sectional hospital based study carried out in neonates in the labour, postnatal and neonatal wards at Kairuki and Mwananyamala hospitals in Dar Es Salaam, Tanzania. Two hundred and seventy two (272) neonates born at Kairuki and Mwananyamala hospitals from May to July, 2019 were enrolled. Blood sample obtained from the heel prick at intervals of one, six, 12, 24 and 72 hours to determine blood glucose levels. A blood glucose level of 2.77 mmol/L was considered a cut off point for a normal blood glucose level. Results: A total of 272neonates were recruited in the study. The overall prevalence of hypoglycemia was 25.7%. The prevalence of Hypoglycemia at one, 6 and 12 hours after delivery were 8.5%, 16.5% and 0.7% respectively. None of the neonates had hypoglycemia after 24hours of delivery. Neonates who were breastfed within one hour of delivery had a lower rate of hypoglycemia when compared to those who were not breastfed within the first hour of delivery adjusted Odd's ratio of 11.615. Out of the 70 children who had hypoglycemia 6 (%) developed seizures. Conclusions: The overall prevalence of neonatal hypoglycemia in this study was 25.7%. The majority of neonatal hypoglycemia in this study was asymptomatic. The highest prevalence 16.5% of neonatal hypoglycemia was at six hours of life. The majority of neonates had presented with asymptomatic hypoglycemia.***

Keywords: Neonatal hypoglucaemia, Prevalence, Morbidity and mortality

1. Introduction

1.1 Background

Neonatal hypoglycemia is defined as the reduction of the glucose concentration of circulating blood.1 A neonate is considered to be hypoglycemia when whole blood glucose level is< 2.2mmol/l while blood glucose level of >2.2mmol/L in the first 24 hours is considered to be normal, this is according to WHO guideline.[2]

Different studies have been defining neonatal hypoglycemia differently. Conrblathe in 2000 has defined hypoglycemia when blood glucose level is 2.2mmol/l or plasma glucose is less than or equal to 2.5mmol/l.3On the other hand, Bromiker et al from Israel defines neonatal hypoglycemia as a cutoff point of 2.2mmol/l and 2.6mmol/l as moderate and mild hypoglycemia respectiverly.4According to the Nelson text book of Paediatrics, hypoglycemia is defined at a cutoff point of 2.77mmol/l within the first twenty four hours after delivery.5 On the other hand, Dekede et. al 2011 from Nigeria has defined neonatal hypoglycemia as when blood glucose level is less than or equal to 2.5mmol/l.6In Kenya Osier et. al defines neonatal hypoglycemia as when the whole blood is less than 2.2mmol/l.7It is obvious that there is a huge difference between these definitions which are ranging from 2.2 mmol/l to 2.77 mmol/lt

For the purpose of this study hypoglycemia will be defined as when the whole blood glucose is less than 2.77mmo/l. This definition has been derived from Nelson text book of Paediatrics.

Neonatal hypoglycemia is associated with morbidity and mortality when it occurs in the first few hours of life.7Therefore, maintaining normal blood glucose level is an important part of paediatric care in order to ensure child survival.8 Signs and symptoms of hypoglycemia are nonspecific[8]. On the other hand hypoglycemia can also be present without symptoms; the so called asymptomatic hypoglycemia and which is found among neonates at risk of hypoglycaemia.8This means that many neonates with asymptomatic hypoglycemia may not be detected unless if there is a routine measurements of glucose levels of all newborn babies in a particular hospital.

It is difficult to establish the diagnosis of hypoglycemia in neonates since many of the symptoms are non - specific and occur because of many other conditions such as sepsis, meningitis, haemorrhage, asphyxia, apnoea of prematurity and congenital heart disease.8Symptoms that presents in hypoglycaemic neonates include: apathy, episodes of cyanosis, convulsions and coma, eye rolling, tachypnoea, weak or high - pitched cry, lethargy, difficult in feeding, episodes of sweating, sudden pallor, hypothermia and cardiac arrest.[8]

Several factors have been reported that place neonates at risk of hypoglycemia. Such factors include prematurity, small for gestation age, hypoxic ischaemic encephalopathy, and neonatal infections.9 Preterm and small for gestational neonates are at high risk of developing hypoglycemia, which is due to decrease in tissue glycogen stores and decreased gluconeogenesis. Hyperinsulinaemia increases glucose demand in cases of hypoxia and hypothermia, inadequate muscles protein and body fat needed to sustain the substrate required to meet energy needed and immature enzymes.[8]

Twin delivery and small for gestational age neonates have also been reported to be at risk of hypoglycemia by Bromiker et al 2017 from Israel.4Low social economic status, hypothermia, and poor sucking are risk factors for hypoglycemia that have been reported by Decade in Nigeria 2011.6A study carried out in India in 2000 by Pal et. al reported neonatal hypoglyacemia to be associated with post maturity, feeding delay, high maternal thyroid stimulating hormone (TSH) and maternal anaemia.1[0]
The incidence of neonatal hypoglycemia increases several fold in high risk neonates.[4]

In the entire population of high risk infants the incidence may be as high as 30%.2 However, the prevalence of hypoglycemia reported from different countries is difficult to compare because of the differences in definitions, timing, population, infants age and technical methods used.1[0]In one study carried out by Stomnanoska et al 2017 in Europe found all neonates to have hypoglycemia of early onset (before 72hours).9Deaths from neonatal hypoglycemia are preventable, and no neonate should die or suffer unnecessary complications from neonatal hypoglycemia. This is possible only with proper planning and strategies to prevent hypoglycemia from occurring. In order to achieve this we need research studies that will provide accurate data about the prevalence, the risk factors and their associations with neonatal mortality. We also need to know the complications including deaths due to neonatal hypoglycemia in the neonatal period.

The findings of this study will be shared with hospital and other policy makers and may be used to prepare neonatal hypoglycemia preventive policies and guidelines, and policies for proper management of pregnant women and follow up of neonatal hypoglycemia in order to take urgent steps to prevent neonatal hypoglycemia.

Prevention of hypoglycemia in neonates is most important in order to increase child survival; the main preventive measure of neonatal hypoglycemia is an initiation of early and exclusive breastfeeding within the first hour of life. Concurrent with early breastfeeding it is important to have measures for early detection and treatment of various causes of hypoglycemia including keeping warm the neonates soon after delivery. Neonates have large body surface area with a tendency of losing heat from the body. Therefore neonates should be dried thoroughly immediately after delivery and kept on the mother's chest with skin to skin contact to provide warmth.

Treatment of acute symptomatic neonates with hypoglycemia includes administration of 10% dextrose 2ml/kg as a bolus start, followed by a continuous infusion of 10% glucose at 6 - 8ml/kg/min. If hypoglycemia presents with seizures the infusion should be increased up 4ml/kg bolus. In persistence hypoglycemia it is necessary to continue infusion of 10 - 15mg/kg/min. If hypoglycemia is due to hyperinsulinemia this should be medically managed initially with diazoxide 20mg/kg /day and somatostatin analogy and if hypoglycemia does not respond total or partial pancreatectomy should be considered.

Prolonged neonatal hypoglycemia when not immediately managed ends up with early and late outcome. Different Authors have reported early complications of neonatal hypoglycemia including, intracranial hemorrhage, seizures and in severe cases it may lead to death.[6, 9, 12, 13, 17]Late outcomes known to be associated with neonatal hypoglycemia are mental sub normality, subtle effects on personality, cerebral palsy, developmental delay and motor deficity.[8, 11]

This is because in neonates glucose is the major source of energy and the newborn brain depends almost exclusively on glucose. High mortality rate have been observed in developing countries when compared to developing country.[6, 9, 17] which is possibly due to inadequate management of neonatal hypoglycemia in developing countries.

Despite the high rate of morbidity and mortality in neonates, health facilities in sub - Saharan Africa are still facing challenges on routine screening and monitoring of blood glucose levels in high risk neonates and especially those who are asymptomatic, and those with non - specific presentations. Routine check - up and monitoring of at risk neonates within a few hours after delivery is the only way which will identify those requiring prompt treatment and prevent the permanent damage and promote survival of neonatal who suffer neonatal hypoglycemia.

This study will raise awareness among health workers and other stakeholders with regard to the problem of neonatal hypoglycemia in order to make decisions of developing guidelines or standard operating procedures for early screening and monitoring of blood glucose level for at high risk neonates with hypoglycemia. Doing so will enable health workers to detect early challenges associated with hypoglycemia for immediate intervention to minimize morbidity and mortality. There is paucity of evidence based research in our country. There is therefore no adequate data on prevalence and risk factors to and early outcome associated with hypoglycemia in neonates hence the current project whose objective is to determine prevalence, risk factors to and early outcome within 72 hours of neonatal hypoglycemia in neonates delivered at Mwananyamala and Kairuki hospitals in Dar es Salaam Hypoglycaemia is not regularly checked in asymptomatic neonates despite known risk factors.

2. Methodology

2.1 Study Design

This was a hospital based descriptive cross - sectional study which was conducted in the labour and postnatal wards and neonatal units in Mwananyamala Regional and Kairuki hospitals.

2.2 Study Duration

The study was conducted in the period of three months from April to July2019.

2.3 Study Area

The study was conducted at Mwananyamala and Kairuki Hospital in Dar es Salaam, Tanzania.

2.4 Study Population

Newborns delivered at Kairuki and Mwananyamala Hospitals during period of the study**.**

2.5 Inclusion Criteria

1) All consecutive neonates delivered in the labour wards of the two Hospitals and admitted into neonatal wards within72 hours of life were eligible for the study.
2) Mothers of neonates who granted written informed consent.

2.6 Exclusion Criteria

1) Very sick neonates requiring resuscitation and basic life support
2) All neonates with major congenital malformations.
3) All neonates whose mothers did not have reproductive and child health cards (RCH)
4) All neonates whose mothers did not grant written informed consent to participate in the study.

2.7 Sampling Technique

All neonates who were delivered in the labour wards and admitted into the neonatal wards in Mwananyamala and Kairuki Hospitals who met the criteria to participate in the study and whose mothers' provided written informed consent were consecutively enrolled until the sample size was attained. It was a random sampling technique.

2.8 Sample Size

The sample size was calculated using Kothari formula, 272 Neonates were recruited.

2.9 Data Collection Technique

After written informed consent to participate in the study was granted neonates that meet the inclusion criteria were enrolled.
Structured questionnaires were used to collect information on neonatal age, sex, place of birth, birth weight and gestation age, temperature, Agar score, maternal and neonatal risk factors for hypoglycemia were recorded. Random blood sugar level was estimated using glucometer machine, which is Easy touch type of machine; made in Taiwan with a measuring range of 20 - 600mg/dl (1.11 - 33.33mmol/lt and test time is 10 second. The first postnatal glucose was tested at one hour, the second at 6hours and 24 hours and for those found to be hypoglycemic additional glucose monitoring was done at 12hours, and 72 hours of life.

Using aseptic technique the area to be pricked (heel) was cleaned with an alcohol swab and allowed to dry before pricking; blood sample was obtained from the heel of the patient.

Glucometer strip was inserted into the meter and when the glucometer starts blinking; the blood sample was applied to the test area on strip. The blood glucose level of less than 2.7mmol/l was considered hypoglycemia.

For those neonates found with low blood glucose levels together with the team of health care providers taking care of the neonates ensured prompt treatment. Neonates were given 10% dextrose 5mls/kg as bolus and those with birth asphyxia were given 10% dextrose intravenous for twenty four hours and all responded with the initial treatment.2

3. Data Management

3.1 Data Entry and Analysis

Questionnaires were checked for completeness and accuracy each day. Then data were entered into the database and stored in a Microsoft Excel file and later transferred to statistical package for social science (SPSS) version 20 for analysis. Chi - square test or Fisher's exact test were used to test association between two categorical variables such as sex, education level, model of delivery, birth asphyxia, breastfeeding, preterm baby where appropriate. Descriptive statistical were generated for each study variable. Binary logistic regression analysis was used to determine maternal and neonatal risk factors associated with neonatal hypoglycemia. Adjusted odds ratios and 95% confidence interval were calculated to determine the strength of association. The probability value (p - value) of less or equal to 0.05 was considered statistically significant. The 95% confidence interval was determined and risk factors with a p - value of less than 0.05 were considered significant.

3.2 Ethical Clearance

Ethical clearance to conduct the study was obtained from the Ethical review committee of Hubert Kairuki Memorial University (HKMU) and permission to carry out the study was sought from the Administration of Mwananyamala and Kairuki Hospitals.

4. Results

4.1 Baseline Characteristics of the neonates

A total of 272 neonates were included in the study out of whom 97 (35.66%) were delivered at Kairuki hospital and 175 (64.34%) were delivered at Mwananyamala hospital. Thirteen neonates 13 (4.78%) had birth weight of 1500 - 2499gram and 259 (95.22%) had birth weight of ≥2500grammes. Eleven 11 (4.04%) were preterm with gestational age of between 33 - 36weeks. Out of the all the neonates studied 261 (95.96%) were born with a gestational age of ≥37 weeks. Of the studied neonates 101 (37.13%) were born by C/S and 169 (62.13%) were normally delivered i. e. SVD. Two 2 (0.74%) neonates were delivered by instruments (see table one below)

Table 1: Baseline Characteristics Of Neonates

Variable	Frequency n=272	Percent %
Hospital		
Kairuki	97	35.66
Mwananyamala	175	64.34
Sex		
Male	131	48.16
Female	141	51.84
Birth weight (in grams)		
1500 - 2499	13	4.78
≥2500	259	95.22
Gestational age (in weeks)		
33 - 36	11	4.04
≥37	261	95.96
Model of Delivery		
Normal delivery	169	62.13
C/S delivery	101	37.13
Instrumental (vacuum)	2	0.74

4.2 Prevalence of Neonatal Hypoglycaemia

A total of seventy (70) out of 272 neonates were found to be hypoglycemia. The overall prevalence of neonatal hypoglycemia was 25.7% (Figure 1 refers)

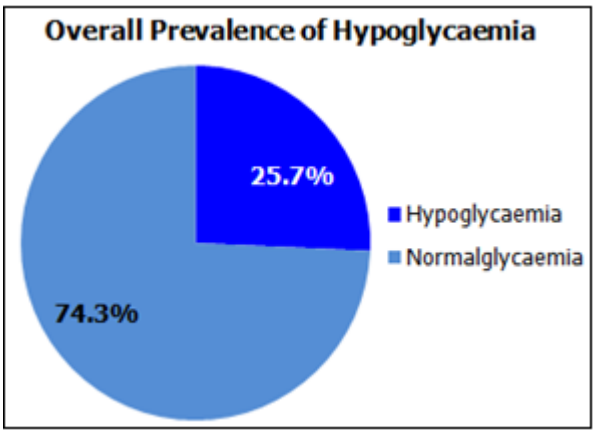

Figure 2

4.3 Prevalence of hypoglycemia at one hour, six hours, twelve hours, twenty four and seventy two hours after delivery.

At the first hour of life 23/272 neonates were found to have hypoglycemia. This was a prevalence of 8.5%. At the same one hour after birth 249 (91.5%) were normal glycaemic. At six hours there were 45 (16.5%) neonates with hypoglycemia and 227 (83.5%) neonates were normaglycaemia. At 12 hours after birth only two (2) neonates were found to be hypoglycemia a prevalence of 0.7%. No neonates developed hypoglycemia at twenty four 24) hours and 72 hours after birth. (Figure 2 below refers)

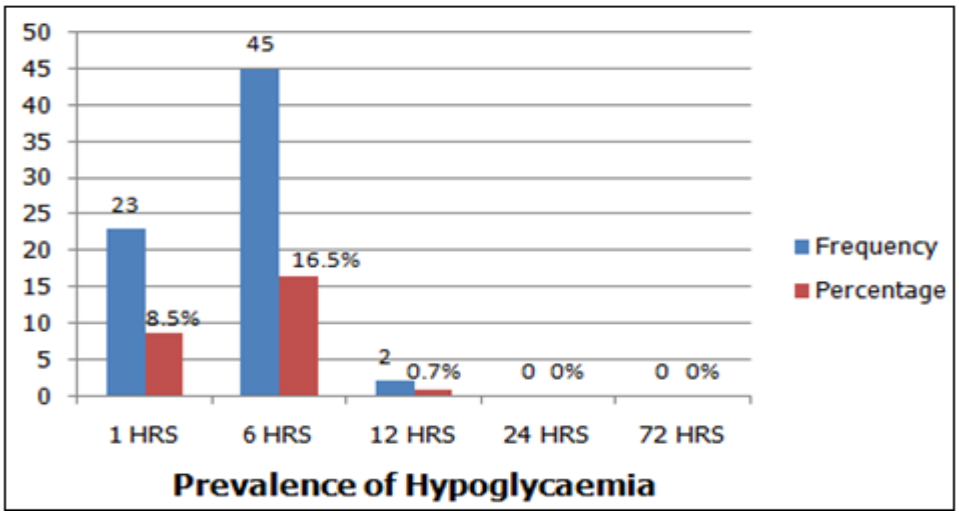

Figure 3: Prevalence of hypoglycaemia

4.4 Risk Factors Associated with Hypoglycaemia

Neonatal risk factors for hypoglycemia within one hour in this study are shown in Table 3below with the following findings.

Birth weight: This study found Low birth weight (LBW) not to be associated with hypoglycemia in neonates, as the adjusted odds ratio was 1, increases risk by one which is not significant.

Birth asphyxia: It was statistically not significant adjusted. Odds ratio was 1.884 (0.124 - 28.582) with p - value of

0.648 which increases the risk by one which is not significant.

Breastfeeding: The current study found a strong association between neonates who did not breastfeed within one hour after delivery and hypoglycemia, which was statistically significant. The adjusted Odds ratio was 11.615 (1.528 - 88.285) and p - value of 0.018, which increases the risk of developing hypoglycemia by eleven times which is statistically significant.

Sex: Being a male or a female had no effect on neonatal hypoglycemia. Sex was not associated with neonatal hypoglycemia as the adjusted odds ratio was 0.43 (0.1790 - 1.148) and p - value of 0.095 which was not statistically significant. Among the 70 hypoglycaemic neonates 3 were preterm. However found their P - value was 0.06 which was not statistically significant. Meaning that preterm was not found to be a risk factor in this study.

Table 2: Neonatal risk factors associated with hypogycaemia at one hour of delivery

Variables	Glycaemic status	Hypoglycemic N=23, n (%)	Normalglycaemic N=249, n (%)	AOR	P value	95% CI	
Low Birth Weight	Yes	2 (8.7)	11 (4.4)	1			
	No	21 (91.3)	238 (95.6)	.490	.392	.096	2.508
Birth asphyxia	Yes	1 (4.3)	8 (3.2)	1			
	No	22 (95.7)	241 (96.8)	1.884	.648	.124	28.582
Breast fed within 1 hour after delivery	Yes	9 (39.1)	156 (62.7)	1			
	No	14 (60.9)	93 (37.3)	11.615	.018	1.528	88.285
Sex	Male	15 (65.2)	116 (46.6)				
	Female	8 (34.8)	133 (53.4)	0.43	.095	.179	1.148
Pre Maturity	Yes	3 (13.0)	8 (3.20		.06		
	No	20 (87.0)	242 (96.80)				

Maternal risk factors for hypoglycemia within one hour of delivery in this study are shown in **Table 3 below** and the findings were as follows:

Maternal level of education:
For mothers with **primary level of education** the adjusted odd ratio was 0.1584 (0.000) with P - value of 0.999 not statistically significant.

For **secondary level of education** mothers the adjusted odd ratio was 1.227 (0.410 - 3.9848) with P - value of 0.677 and was not statistically significant.

For higher education level mothers the adjusted odd ratio was 2.358 (0.443 - 0.263) with p - value of 0.443 not statistically significant.

Model of delivery:

For normal delivery the odd ratio was 1 was not significant, for instrumental delivery the adjusted odd ratio was 0.59 (0.002 - 2.062) with p - value of 0.118 statistically not significant

For caesarian section model of delivery adjusted odd ratio was 0.59 (0.002 - 2.062) and P - value of 0.12 statistically not significant.

Infusion given during intrapartum: it has no effect in neonatal hypoglycemia. Three (3) hypertensive mothers were found in this study but none of the neonates developed hypoglycemia.

Table 3: Maternal Risk Factors Associated with Hypoglycemia at One Hour of Delivery

Variables		Glycaemic status					
		Hypoglycemic N=23, n (%)	Normalglycaemic N=249, n (%)	AOR	P value	95% CI	
Maternal Level of education	None	0 (0)	6 (2.4)	1			
	Primary	12 (52.2)	154 (63.8)	.1584	.999	.000	.
	Secondary	1 (4.3)	16 (6.4)	1.272	.677	.410	3.948
	Higher Education	10 (43)	73 (26.3)	2.358	.443	.263	21.114
Mode of Delivery	Normal	11 (47.8)	158 (63.5)	1			
	Instrumental	1 (4.4)	1 (0.4)	.059	.118	.002	2.062
	Caesarian Section	11 (47.8)	90 (36.1)	0.59	0.12	.002	2.062
Any infusion given	Yes	13 (56.5)	104 (41.8)	.823	.825	.146	4.631
	No	10 (43.5)	145 (58.2)				
Maternal Hypertension	Yes	0 (0)	3 (1.2)		.77		
	No	23 (100)	246 (98.8)				
Antihypertensive drugs	Yes	(0)	3 (1.2)				
	No	23 (100)	246 (98.8				

4.5 Outcome of Neonates with Hypoglycaemia

Of the 70 neonates with hypoglycemia six (8.5%) developed seizures. All the six neonates who developed seizures responded well to the initial therapy of 10% Dextrose infused intravenously. This was a proof that seizures in these neonates was caused by hypoglycemia. Another reason is that the neonates who developed seizures had no signs

suggestive of intracranial haemorrhage and or birth asphyxia. At 72 hours no neonate was found to have hypoglycemia meaning that all 70 neonates who had developed hypoglycemia at one, six and twelve hours had improved completely within 72 hours. No deaths were associated with hypoglycemia within 72 hours of observation after birth.

5. Discussion

Hypoglycaemia in this study was defined as blood glucose level of less than 2.7mmol/l and a total of two hundred and seventy two hundred (272) neonates were recruited in the study. Ninety seven (97) neonates were from Kairuki and 175 from Mwananyamala hospitals Males and females were 131 and 141 respectively. The prevalence was difficult to compare because most of studies differed in terms of definitions with cutoff point of hypoglycemia and timing of measuring blood glucose. In this study 70 neonates developed hypoglycemia which an overall prevalence 25.7%. Prevalence of hypoglycemia at one hour, six hours and twelve hours after birth were8.5%, 16.5% and 0.7% respectively. The highest prevalence (16.5%) was observed at six hours after birth. The overall prevalence (25.7%) was almost similar to the findings by Osier in Kenya. In his study in Kenya in 2003, he reported a prevalence of 22.03%. Much lower prevalence of neonatal hypoglycemia of 11%, 9.5% and 6.6% have been reported by Ochoga M, Njokamna OF and Omena JA respectively. The current prevalence of 25.7% in this study are lower than the prevalence of 32.7% reported by Dekede IOF [6] in Nigeria in 2018the prevalence of 41% reported in the same year by Deb K Pal India. The prevalence of 25.7% in this study could have been higher if all neonates delivered during the study period especially at Mwananyamala hospital had been included in the study. The strength of this study is that, the blood glucose level was measured at intervals of one, six, 12, 24, and 72 hours after birth, unlike in other studies who measured blood sugar levels either once in 12 or in 24 or in 72 hours which does not tell you exactly when they neonates develop hypoglycemia. This study has made it possible to know exactly at what time after birth in the first three days neonates developed hypoglycemia; which in this study was at six hours after birth with prevalence of 16.5%. According to this study no neonate developed hypoglycemia after 24 or 72 hours. The prevalence of hypoglycemia seems to be different indifferent studies and therefore impossible to compare their findings due to the differences in terms of definitions/cut off point of hypoglycemia and the timing of measuring blood glucose. In this study all neonates had developed hypoglycemia of early onset (in the first six hours after birth). The findings are consistent with the findings of Stomnanoska O[9]in Europe and Ochoga M from Nigeria[12]The neonates in this study developed asymptomatic hypoglycemia which is said to be common among apparently health neonates. The same was reported in 2018 by Deb KP [10] in India. Neonatal risk factors studied in the present study were Prematurity, low birth weight, birth asphyxia, delay in breast feeding and sex. The current study found no association between Low birth weight and hypoglycemia. The findings of this study are different from those of many studies done in both developed and developing countries which have shown low birth weight to be associated with hypoglycemia. Studies conducted by Dekede IOF, Stomnaroska O, Ochoga M and Band A.6[, 9, 12, 15] have reported low birth weight to be a risk factor in neonatal hypoglycemia. One reason could be the small sample size in this study. The other reason is that the study did not enroll all neonates delivered in Mwananyamala because of the quick turnover of patients born in this hospital. This could have reduced the number of neonates with low weight babies.

Of the nine neonates with birth asphyxia only one developed hypoglycemia within one hour after delivery but this was not statistically significant. This finding was different from other studies which found birth asphyxia to be a risk factor to hypoglycemia: Corblath M, Ayoub IN, and Stanley CA[3, 18, 26]. Out of the eleven (11) preterm babies in this study only three (3) of them developed hypoglycemia. The study found a strong positive association between hypoglycemia and neonates who did not breastfeed within one hour after delivery, it has shown that it is eleven times more likely to develop hypoglycemia in neonates who did not breast feed within one hour than those who were initiated breast feeding early after delivery, with the P value of 0.018, These results are similar with a prospective cohort study done by Chertok IR in United states of America, in India by Samayam P and Dek AK in Nigeria [23, 27.28] shows neonates who were breast fed within one hour had a significantly lower rate of hypoglycemia than those who were not breastfed. Deb K Pal et al in India founds delay breastfeeding is a risk factor of hypoglycamaemia$_{10}$These findings supports WHO and UNICEF recommendation that early breastfeeding helps to prevent hypoglycemia.

In this study the majority of neonates developed hypoglycemia at six hours, this suggests that it could be due to inadequate/ poor feeding of neonates after delivery.

The poor feeding possibly due to poor positioning of the mothers and the baby, poor attachment, and the baby might not be feeding regularly or on demand as recommended by world health organization (WHO) and UNICEF. Also probably mothers are not well fed before and after delivery. The study shows that males were more affected with hypoglycemia than females. The findings are similar to those of Cornblath M, Ayoub IN, Schwartz r and Beozly JM.3[, 18, 24], Model of delivery in this study was not associated with neonatal hypoglycaemia this results are different from what was observed by Simmons D and Thompson 25 there study found caesarian section was associated with hypoglycemia

The maternal risk factors studied were maternal hypertension, use of IV fluids during intrapartum, the use of alpha blocker (antihypertensive drugs). All maternal risk factors were not significantly associated with neonatal hypoglycemia. The use of intravenous infusion was not associated with neonatal hypoglycemia, In other studies elsewhere 10% dextrose infusion has been found to be significantly associated with hypoglycemia in other studies in Benin, Nigeria by 'Ochoga M and in 2018 in Iraq by Ayoub et. al I. N [12, 18]. The reason here could be that in this study had used Dextrose/Saline (DNS) rather than 10% Dextrose which were normally used in other studies.

This study did not find any case with persistent hypoglycemia, all neonates found having hypoglycemia responded well to intravenous glucose. In the current study seizures in hypoglycaemic neonates occurred in six neonates. This is similar to the findings of Dekede IOF, Stomnaroska O, Dasit N and Sebzebei MK.6, [9, 14, 17]observed that birth asphyxia was not a risk factor in the neonatal hypoglycemia but seizures were observed by Stomnaroska O[9]. No neonates with hypoglycemia had intracranial haemorrhage. However, intracranial haemorrhage among hypoglycaemic neonates was observed by Stomnaroska O and, Sebzehei MK).9, [17]their findings are similar to the findings since the neonatal hypoglycemia in this study showed no signs of intracranial haemorrhage. The current study found no death among hypoglycaemic neonates, which is different from other studies which have reported deaths. This could be because in this study, most neonates who developed hypoglycemia were healthy and had no co - morbidity. In the other studies reported above their neonates with hypoglycemia who died had other co - morbidities such as hypoxic ischaemic encephalopathy, neonatal sepsis, respiratory distress syndrome and intracranial haemorrhage[5, 6, 9, 17, 20]

6. Conclusions

The overall prevalence of neonatal hypoglycemia was 25.7%. The highest prevalence 18%) of neonatal hypoglycemia was six of delivery. No neonates developed hypoglycemia after 24 and 72 hours after delivery. Neonatal hypoglycemia was mainly asymptomatic as there were no signs and symptoms of hypoglycemia observed in the neonates. Delay in initiation of breastfeeding within one hour after delivery was strongly associated with neonatal hypoglycemia. Maternal education, mode of delivery and hypertension were not a risk to neonatal hypoglycemia. Low birth weight and sex had no association with neonatal hypoglycemia. All 70 neonates with hypoglycemia improved well at 72 hours after birth after treatment with 10% Dextrose infused intravenously.

7. Recommendations

Further studies are recommended to follow up on these findings preferably with a large sample size for in - depth understanding of the problem of neonatal hypoglycemia.

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