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Prevalence and Factors Associated with Birth Asyphyxia among Neonates Admitted at Amana Regional Referral Hospital in Dar ES Salaam, Tanzania - October 2025

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ABSTRACT: Birth asphyxia is the failure to establish and sustain spontaneous breathing at birth, hence leading to decreased oxygen perfusion to various organs. Birth asphyxia is among the leading causes to neonatal mortality and morbidity in Tanzania, our study aimed to determine prevalence and associated factors of birth asphyxia among neonates at Amana Regional Referral Hospital**.** A cross-sectional study was conducted, enrolling neonates admitted at neonatal ward in ARRH. Data was collected through structured questionnaires given to mothers of neonates admitted, also antenatal cards and case files were used to obtain Apgar scores and additional information. Of all neonates admitted during study period, 303 neonates were included in the study where by, 10 newborns (3.3%) had birth asphyxia, and prolonged labor, hospital delivered neonates and age of the mother 20-34 were significant factors associated with birth asphyxia.
Birth asphyxia is still a public health concern in Tanzania and its aftereffects are irreversible so early and regular antenatal booking, proper management of labor and improvement of maternal and child health services can reduce the burden also, awareness of pregnancy demands can help mothers handle pregnancy with care hence avoiding risk factors and complicated labor and delivery.

KEYWORDS: Apgar Score, Birth Asphyxia, Neonates, Prolonged labor, Tanzania

INTRODUCTION

Birth Asphyxia refers to failure to establish and sustain spontaneous breathing at birth (WHO 2021). It is a major contributor to neonatal mortality worldwide (Abdo et al. pregnancy and child health 2021).
According to International Classification of diseases (ICD-10) of WHO, uses Apgar score to define birth asphyxia into mild and moderate when Apgar score at 5 min is 4-6 , and severe when Apgar score is 0-3. Birth asphyxia compromise a larger proportion of cases in developing countries rather than their developed counterparts. (Ritbano Ahmed et.al 2021)
Globally 2.5 million neonates died in 2018, where approximately 7000 neonates die every day. Approximately 24% of all neonate's death are attributed to birth asphyxia. In 2018 sub-Saharan Africa had high neonatal mortalities die to birth asphyxia with 28 deaths per 1000 live birth. According to UNICEF and WHO, the proportion of neonatal death in Africa due to birth asphyxia in 2018 was 31%. (Helena Marco et al. 2023)
In Tanzania, the mortality accounts for 32 deaths per 1000 live birth and 68 per 1000 live birth for infants, the main cause was (pneumonia 29%, birth asphyxia 27% and pre term birth 23%). Despite comprehensive intervention in neonatal resuscitation including Helping Baby Breath (HBB), Basic emergency obstetrics care and Comprehensive obstetrics emergency care, the neonatal mortality and morbidity persist due to Birth Asphyxia (Helena Marco et al .2023)
Causes of birth asphyxia may be maternal or fetal related. Those neonates who survive asphyxia at birth have highly chance of developing neurological complications including epilepsy, cerebral palsy and developmental delay (Ndayisenga et al.2017) This condition may be caused by antepartum, intrapartum events and postpartum or a combination of both.
Birth asphyxia is one of the potential factors associated with neonatal mortality in Amana Regional Hospital. Therefore, this study aimed to determine the magnitude of the birth asphyxia and factors associated with it in Amana regional referral hospital in Dar es salaam, Tanzania.

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1.2 PROBLEM STATEMENT

Birth asphyxia remain a major public health concern particularly in developing countries like Tanzania. Despite proper follow up during Antenatal Period and other interventions, birth asphyxia has been the leading cause of neonate's mortality and other serious morbidities. At Amana Regional Referral hospital, the prevalence and associated factors of birth asphyxia were not yet studied.
Known risk factors such as advanced age of the mother, infections, Low birth weight, prematurity and multiple gestation contribute to birth asphyxia but their exact local impact is unknown.
There was a gap in research focused on specific factors of birth asphyxia at Amana Regional Referral hospital. This study aimed at identifying the prevalence and factors associated with birth asphyxia in neonates at ARRH so as to evaluate the burden of it to ensure proper health interventions also to provide training to health care providers empowering them with knowledge about risks and management strategies associated with asphyxia.

OBJECTIVES

- To determine the prevalence of birth asphyxia among neonates admitted at Amana RRH
- To determine factors associated with birth asphyxia among neonates admitted at Amana RRH

METHODOLOGY

Methodology of this study was designed to assess the prevalence and factors associated with birth asphyxia among neonates at Amana hospital, it includes study design, population, sampling technique, inclusion and exclusion criteria, data analysis methods and ethical consideration.
This research was a Cross-sectional study designed to assess the prevalence and factors associated with birth asphyxia among neonates at Amana hospital.
The study was conducted at Amana RRH located in Dar es salaam, Tanzania. It is one of the largest referral centers in the region providing maternal and child health care.
The targeted population was neonates admitted at Amana RRH during period of data collection.
The sample size was calculated using modified Cochrane formula for cross section studies to ensure adequate presentation.
$N=Z^2(P)(1-P)/E^2$
where by
N is the sample size
Z is standard deviation of 1.96
P is estimated prevalence of birth asphyxia (Helena Marco et al.)
E is the margin of error 0.05
Using the formula
$N= (1.96)^2(0.27)\ (1-0.27)/0.05^2$
N=303
The sample size used was 303 neonates
The inclusion criteria of this research were neonates of mothers who attended Antenatal care services during pregnancy and were willing to participate in the study.
The exclusion criteria involved the neonates of mothers who didn't attend antenatal care services and mothers not willing to participate in the study.
To collect data, the following tools were used
Structured Questionnaire
Antenatal cards
Case files
They were used to provide the information mothers had forgotten and for some neonates their Apgar scores were recorded in them
The data collected was coded, entered and cleansed using EpiData and then was transferred to SPSS statistical software for data analysis. Data and tables are used for descriptive statistics. Frequency and percentage of variables are presented in tables.

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Ethical approval for this study was obtained from Kampala International University's ethics review committee and permission to perform study was sought from Amana Regional Referral hospital. This was to ensure that the study adhere to ethical guidelines in medical research involving human participants.

RESULTS

DATA ANALYSIS AND INTERPRENTATION OF FINDINGS

This chapter presents findings of data collected on prevalence and factors associated with birth asphyxia among neonates at Amana regional referral hospital in Tanzania.

Data are presented in tabular form using frequencies and percentages for clarity and easy understanding. This analysis provides ways for proper interventions to resolve the issues on burden and factors associated with birth asphyxia to both care givers, mothers and society in general.

SOCIO-DERMOGRAPHIC AND CLINICAL CHARACTERISTICS OF ALL PARTICIPANTS (N=303)

Table 1: sociodemographic and clinical characteristics of mothers and neonates

VARIABLES	CATEGORY	FREQUENCY	PERCENT (%)
Age of mothers	<21	15	5
	21-34	177	58.4
	>34	111	36.6
Education level	Primary	16	5.3
	Secondary	182	60
	College and university	105	34.7
Occupation	Employed	62	20.5
	Entrepreneurs	146	48.1
	Housewives	95	41.4
Parity	Primipara	97	32
	Multipara	174	57.4
	grand multipara	32	10.6
Antenatal booking	Early booking	288	95
	Late booking	15	5
Comorbid conditions	Pre-eclampsia	29	9.6
	Eclampsia	3	1
	Anemia	8	2.6
	Antepartum hemorrhage	3	1
	Oligohydramnios	2	0.7
	Gestational diabetes	1	0.3
	PMTCT 1	3	1
	Hepatitis B	1	0.3
	No comorbid	253	83.5
Place of delivery	Hospital	277	91.5
	Health center	24	7.9
	Home	1	0.3
	Others	1	0.3
Gestational age	Preterm	132	43.6
	Term	170	56.1
	Post term	1	0.3
Mode of delivery	Vaginal delivery	164	54.1

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	Caesarean delivery	139	45.9
Duration of labor	Prolonged	44	14.5
Condition of amniotic fluid	Clear	237	78.2
Sex	Male	159	52.5
Weight	<2.5	154	50.8
	2.5-4	139	45.9
	>4	10	3.3

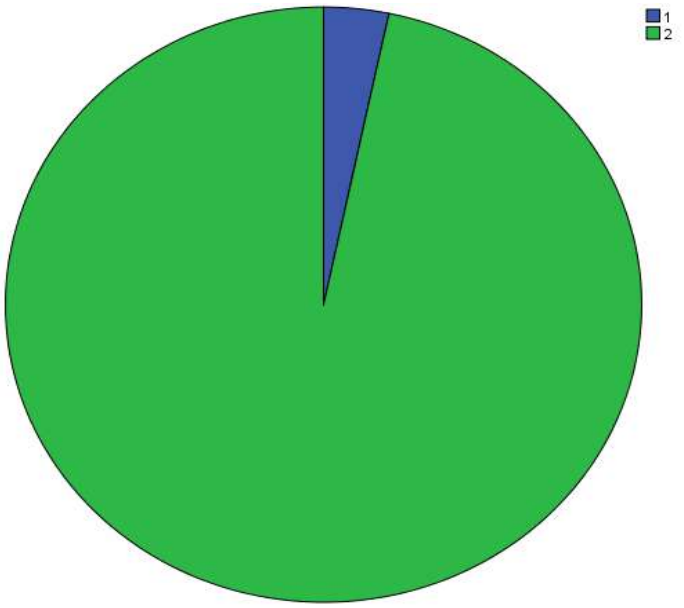
Source: (field data 2025)

The table above shows the sociodemographic and clinical characteristics of mothers and neonates who participated in the study.

4.2 PREVALENCE OF BIRTH ASPHYXIA

The prevalence of birth asphyxia among neonates admitted at Amana Regional referral hospital was found to be 3.3%. Among 303 participants 10 of them had Birth asphyxia with Apgar score between 0-6.

Prevalence of birth asphyxia following the clinical impression given the presentation was found to be 16.2% and they were admitted and treated as cases of birth asphyxia.



1- Birth asphyxia 2- No birth asphyxia

Figure 1: A bar chat above showing prevalence of birth asphyxia

BIVARIATE ANALYSIS SHOWING FACTORS ASSOCIATED WITH BIRTH ASPHYXIA (N=303)

Table 2: Factors associated with birth asphyxia

VARIABLES	CATEGORY	BIRTH ASPHYXIA (YES)	BIRTH ASPHYXIA (NO)	P-VALUE AND X^2
Age of mother	<21	2	13	X^2=6.97
	21-34	7	170	P=0.031
	>34	1	110	
Parity	Prime parous	5	92	X^2=2.237
	Multipara	5	169	P=0.327
	Grand multipara	0	32	

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Comorbid	Pre-eclampsia	2	27	X^2=12.8 P=0.119
	Eclampsia	0	3	
	Anemia	1	7	
	Antepartum hemorrhage	1	2	
	Oligohydramnios	0	2	
	Gestational DM	0	1	
	PMTCT 1	0	3	
	Hepatitis B	0	1	
	No comorbid	6	247	
Labor duration	Prolonged	8	36	X^2=35.720 P=0.000
	Not prolonged	2	257	
Gestational age	Pre term	4	128	X^2=0.092 P=0.955
	Term	6	164	
	Post term	0	1	
Mode of delivery	Vaginal delivery	4	164	X^2=0.831 P=0.362
	Caesarean delivery	6	139	
Delivery place	Hospital	6	271	X^2=36.815 P=0.000
	Health center	3	21	
	Home	1	0	
	Ambulance	0	1	
Weight	<2.5	4	150	X^2=1.030 P=0.598
	2.5-4	6	133	
	>4.1	0	10	

Source: (field data 2025)

The data above shows bivariate analysis between birth asphyxia and the factors associated. From the result above, age of the mother from 20-34, prolonged duration of labor and hospital delivery were found to be significant factors associated with birth asphyxia.

Neonates of mothers aged 21-34 were 6.97 times more likely to get asphyxia than others. Neonates of mothers who experienced prolonged labor are 35.72 times more likely to get birth asphyxia and hospital delivered babies were 36.815 times more likely to get birth asphyxia.

4.4 MULTIVARIATE ANALYSIS

Table 3: Shows multivariate analysis of bivariate variables

VARIABLE	CATEGORY	BIRTH ASPHYXIA (YES)	BIRTH ASPHYXIA (NO)	B COEFFICIENT	P VALUE
Age of mother's	<21	2	13	0.142	0.008
	21-34	7	170		
	>34	1	110		
Labor duration	Prolonged	8	30	0.325	0.000
	Not prolonged	2	257		

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Delivery place	Hospital	6	271	-0.159	0.003
	Health center	3	21		
	Home	1	0		
	Ambulance	0	1		

Source: (field data)

linear regression results show both age of mother, Labor duration and delivery place have p value of <0.05 hence these factors are significantly associated with birth asphyxia.

DISCUSSION, CONCLUSION, LIMITATIONS AND RECCOMENDATION

5.1 DISCUSSION

This study found a prevalence of birth asphyxia to be 3.3% which is lower than expected. This low prevalence can be explained by exclusion of neonates of mothers who didn't attend antenatal clinic. This prevalence is different from the prevalence obtained by the previous studies done in Tanzania and other African countries.

This prevalence is lower than what was provided by Helena marco et al. in Dodoma (27%), Garba et al. in Nigeria (21.1%), Ritbando et al. in Ethiopia (19.3%) and Techane et al. in sub-Saharan Africa (17.28%). The possible explanation for this difference could be due to difference in study setting, study design, level of awareness in regard to maternal and child health and the difference in services provided by health facilities.

Amana Regional Referral hospital conducts regular trainings to Doctors, interns, nurses and medical students concerning birth asphyxia through various programs like Help Baby Breath (HBB) as guided by Ministry of health.

This study showed birth asphyxia is most common to neonates of mothers who experienced prolonged labor than others.Neonates from mother's who had prolonged labor were expected to be at higher risks than those from mother's with unprolonged labor since prolonged duration of labor is associated with many complications. Ritbando et al,msisiri et al, Tewesal et al and Chiabi et al have also shown in their studies that prolonged labor associate with birth asphyxia .The possible explanation for this is, prolonged labor are usually caused by inadequate contractions, obstructed labor, cephalopelvic disproportion and malpresentation. In attempt to increase contractions some medications are used that cause excessive contractions which interfere with blood supply and cause placental insufficiency to the fetus, this could lead to hypoxia and perinatal asphyxia also prolonged labor increases risk of placenta abruption, cutting off the baby's oxygen supply.

Hospital delivered babies were at high risk of developing birth asphyxia than those born in health centers.The same result was observed in the study done by Garba et al in Nigeria. This can be explained by the fact that Amana is a referral hospital which gets referred complicated cases from other hospitals and health centers, this increases the chances to birth asphyxia.

Also, neonates from mothers of age 20-34 were at high risk of developing birth asphyxia compared to mothers of age above 35, This is similar to a study done by chiabi et al.It can be explained by the fact that a lot of first time mothers are in this group, factors like cephalopelvic disproportion and prolonged labor are mostly likely to occur in this age group. Quite contrary to other studies like the one done by Abdo et al, suggesting neonates from mothers of >35 age are at higher risks of birth asphyxia. This difference can be explained by the difference in sample size.

This study shows that others factors like parity, gestation age, comorbid conditions, mode of delivery, sex and birthweight of neonates were insignificantly associated with birth asphyxia.

5.2 CONCLUSION

Birth prevalence has been found to be low with less than 1 in 10 neonates diagnosed of birth asphyxia by Apgar score as compared to almost 2 in 10 neonates presumptively diagnosed by attending doctors. Prolonged labor, hospital delivery and mothers of age 21-34 were factors associated with birth asphyxia.

5.3 LIMITATIONS OF THE STUDY

In this study Apgar score was used to diagnose birth asphyxia, however using Apgar score to diagnose birth asphyxia is dependent on midwife and so is subjective, this is evident in this study because many neonates with Apgar score were clinically managed as birth asphyxia. Also, we were unable to peform Arterial blood gas (ABG) to determine birth asphyxia due to limited resources

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5.4 RECCOMENDATIONS

We would like to recommend increase in trainings on proper management of labor and proper judgement of situations to make quick and right decisions in matters requiring emergency response. We would also like to recommend for another study to compare the use of Apgar score and clinician impression to define birth asphyxia.

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