

Prevalence and Factors Associated with Neonatal Jaundice Among Term and Pre Term Infants at Amana Regional Referral Hospital in DAR ES Salaam, Tanzania

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ABSTRACT

Background: Neonatal jaundice among term and preterm infants in Tanzania is still a very common problem which has a negative effect on children growth and development. Kernicterus as a complication of extensive accumulation of unconjugated bilirubin can lead to mental retardation.

Objective: The study focused on assessing prevalence and factors associated with neonatal jaundice among term and preterm infants at Amana Referral Hospital.

Materials And Methods: Cross section study conducted at Amana Regional Referral Hospital (ARRH) for assessing neonatal jaundice in both term and preterm infants. The sample of 120 children was taken.

The respondent mothers or care takers of infants with neonatal jaundice were structured interviewed based on questionnaire. Kramer's rule as visual inspection of skin used to aid in collecting data.

Expected Results: This study is expected to provide valuable insight into prevalence and factors associated with neonatal jaundice among term and preterm infants admitted at ARRH. Findings will help understanding correlation between factors associated with neonatal jaundice and medical condition itself.

KEY WORDS: Neonatal jaundice, physiological jaundice, pathological jaundice, pre term infants, term infants.

INTRODUCTION

Neonatal jaundice characterized by a yellowish discoloration to the skin and eyes due to elevated bilirubin levels, is a common condition in newborns. In Tanzania like elsewhere it's a frequent reason for hospital visits in the first week of life. While often physiological and resolving on its own, severe case can lead to bilirubin-induced neurological damage.

Research in Tanzania has explored the prevalence, associated factors and effectiveness in clinical assessment in detecting neonatal jaundice.

Neonatal jaundice is a frequent occurrence, with 60% of term and 80% of preterm infants experiencing it in the first week after birth, (Slusher, Angyo & Bode-Thomas et al, 2004). Newborns show clinical signs which tend to start on the face and then spread down the trunk and limbs as a result of high serum level of bilirubin. Jaundice in newborns is a result of increased release of haemoglobin from breakdown of red blood cells due to high haemoglobin at birth, as well as reduced lifespan of new red blood cells (70-80 days) compared to that of adults (90-120 days) and reduced hepatic metabolism of bilirubin due to immature hepatocytes. Most of this newborn's hyperbilirubinemia is a natural transition which resolves by the first week of life with maturing of liver. However, hyperbilirubinemia is also the main reason for hospital admission and readmissions during neonatal period. Hyperbilirubinemia often results in kernicterus with its attendant medical, economic and societies (Adoba, Ephraim & Adomakowaah et al, 2018).

Bilirubin, a byproduct of red blood cell breakdown, is normally processed by the liver. In newborns, the liver may not be fully mature, leading to a temporary buildup of bilirubin. This buildup can cause jaundice, a yellow discoloration of the skin and eyes. While often harmless (physiological jaundice), it can sometimes indicate a more serious underlying condition (pathological jaundice).



Severe, untreated jaundice can lead to bilirubin-induced neurological damage, including kernicterus, which can cause developmental and neurological impairments. In Tanzania, studies have focused on understanding the prevalence of neonatal jaundice and identifying risk factors.

Poor data about neonatal jaundice are observable in Tanzania while different studies in other countries of the world have shown continuously an increasing in neonatal jaundice prevalence. In South Africa the prevalence of neonatal jaundice was 55.2% (Brits et al 2018p 1) whereas in Pakistan, the prevalence of neonatal jaundice was 27.6%. In Tanzania study conducted at Muhimbili National Hospital prevalence was 51.1%. At ARRH, prevalence and factors associated with neonatal jaundice in term and preterm infants not well documented, this makes hard to create targeted intervention due to lack of local data.

There is a gap in research focused on specific factors of neonatal jaundice at Amana Regional Referral Hospital. This study aims at identification of the prevalence and factors associated with neonatal jaundice at ARRH so as to evaluate the burden to ensure proper health intervention and provide training to health care providers empowering them with knowledge about factors and management strategies associated with neonatal jaundice.

Main Objectives

To assess the prevalence and factors associated with neonatal jaundice among new-born admitted at Amana Referral Hospital.

Objectives

Specific Objectives:

- I. To determine the prevalence of neonatal jaundice at ARRH
- II. To describe the factors associated with neonatal jaundice at ARRH

METHODOLOGY

Methodology of study is designed to assess the prevalence and factors associated with neonatal jaundice among neonates admitted at Amana RRH, it includes the study area, study population, study design, sample size and sampling methods and procedures, data collection methods and procedures, data analysis, study limitation and problems, ethical consideration and conclusion. The focus is to ensure proper health intervention to the related case.

Study Design

The study adopts cross sectional study design to assess the prevalence and factors associated with neonatal jaundice in term and preterm infant. Qualitative means of collection of information used in.

Study Population

The population was the total number of newborns admitted in neonatal ward at ARRH. The neonates were selected by means of random sampling. The study aims to include neonates from mothers of different socio-demographic background ensuring that broad range of factors influencing neonatal jaundice can be assessed.

Sampling Methods

Sample size: A total of 120 neonates were recruited into this study. The formula for 'diagnostic sample size calculation' used to calculate the sample size

$$n = Z^2 \times \text{Specificity} \times (1 - \text{Specificity}) / e^2 \times (1 - \text{prevalence})$$

n: Represent sample size

Z: Represent z-score corresponding to the desired confidence level

Specificity: Represent proportion individuals without disease who test negative (true negative)

1-specificity: Represent proportion of individuals without disease who test positive (false positive)

e: Represent desired margins of error

prevalence: Represent proportion of individuals in population who have condition being tested for

1-prevalence: Represent proportion of individuals in the population who don't have the condition q

Specificity of Kramer's methods of 89% from a study conducted in Indonesia (Compr Child Adolesc Nur.2017:40), prevalence on neonatal jaundice of 51.1% in Tanzania as published in the Tanzania Medical Journal and the Journal of African Neonatology, precision of 5 and 95%(z=1.96)

Inclusion Criteria

The inclusion criteria of this research were mothers being admitted at ARRH in neonatal ward who have being attending ANC and they have ANC Card. These mothers were willing to participate in study and give their informed consent

Exclusion Criteria

The exclusion criteria involve the neonates whose mothers do not have ANC Card

Data Collection Plan

After authorization from KIUT I contacted administration at ARRH to request permission to conduct the study in their institution. A modified data collection tool from Hanneke Brits, a researcher from South Africa who conducted the similar study on the prevalence of neonatal jaundice and risk factors in healthy term neonates, has been used with permission to collect data needed to answer the research questions.

Study Variables

Depend Variables

All the neonates who present with yellowish discoloration of the skin and the conjunctiva admitted in neonatal ward at ARRH may be termed as depend variables.

Independent Variables

The independent variables for the neonates admitted in neonatal ward at ARRH involves the maternal age, diabetic mothers, maternal infection during pregnancy, oxytocin use, previous siblings with jaundice, gestation age, birth weight, breastfeeding, G6PD Deficiency, polycythemia.

Data Analysis

The data analysis using descriptive statistics for the first objective of the study to determine the prevalence of neonatal jaundice and inferential statistics was used to describe the risk factors associated with neonatal jaundice. The data was analyzed using a SPSS Software version 21 through the descriptive and statistical tests.

Ethical Consideration

Before conducting the research an ethical clearance from KIUT was obtained, the recommendations from the ministry of health (MOH) also were obtained (APPENDIX) and approval from study site also was obtained (APPENDIX).

Data Management

The filled tool is safe, data was coded and saved into computer, password for securing data created. Both hard copy and soft copy stored.

RESULTS

Maternal sociodemographic characteristics

The majority of the mothers interviewed in this study were aged 18-35 years accounting for 67.4%, and only 8.7% and 24.1% were aged <18 and 35> years old respective. Of these mothers 58.3% were married, 41.7% were separated. Most mothers 43% attained education level up to tertiary level (college and university) 41.5% up to the secondary level and 15.6% dropped out at the primary level 41.5% of these mothers had an informal job 27.4% were unemployed and only 31.1% had formal employment. Table 4.1 that follows shows details

Table 4.1: Distribution of maternal sociodemographic characteristics

Maternal sociodemographic characteristics		Frequency (N=120)	Percentage
Marital status	Married	70	58.3%
	Separated	50	41.7%
Age of the mother	<18 years	9	7.5%
	18-35 years	80	66.7%
	>35 years	31	25.8%

Level of education of the mother	Primary	19	15.8%
	Secondary	50	41.7%
	Tertiary	51	42.5%
Occupation of the mother	Formal	37	30.8%
	Informal	50	41.7%
	Employed	33	27.5%

Neonatal characteristics

Male recruited in this study accounted for 47.8% while female accounted for 52.2%, this gives a ratio of males: females 1:1.09 Majority of the neonates aged >14days old at 43.7% with the least of them being between 0-7 days at 20.7%. At birth 61.1% of the neonates weighed between 2500g-3500g, 21.1% weighed<2500g and 17.8% weighed >3500g. Details are presented in Table 4.2

Table 4.2: Distribution of neonatal characteristics

Neonatal characteristics		Frequency (N=120)	Percentage
Age of the neonate	0-7 days	25	20.8%
	8-14 days	43	35.8%
	>14 days	52	43.4%
Sex of neonate	Male	57	47.5%
	Female	63	52.5%
Birth weight of neonate	<2500g	25	20.8%
	2500-3500g	73	60.8%
	>3500g	22	18.4%

Prevalence of neonatal jaundice

For a total sample of 120 neonates who participated in the study. The prevalence of neonatal jaundice was at 26.67% as shown in Figure 4.1

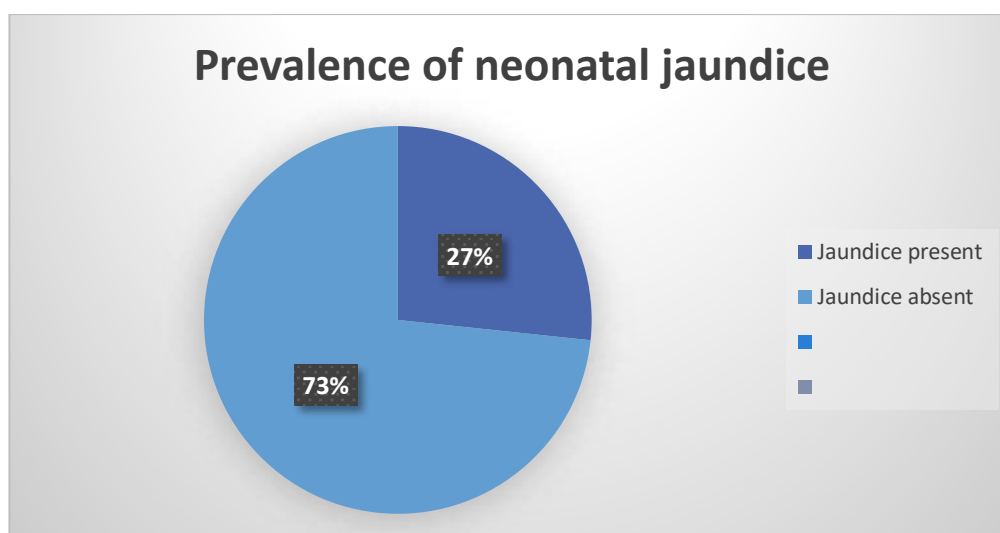


Figure 4.1: Prevalence of neonatal jaundice

Types of jaundice

Figure 4.2 shows the distribution of cases among the types of neonatal jaundice of 32 neonates with jaundice 92.3% had physiological jaundice while 7.7% had pathological jaundice

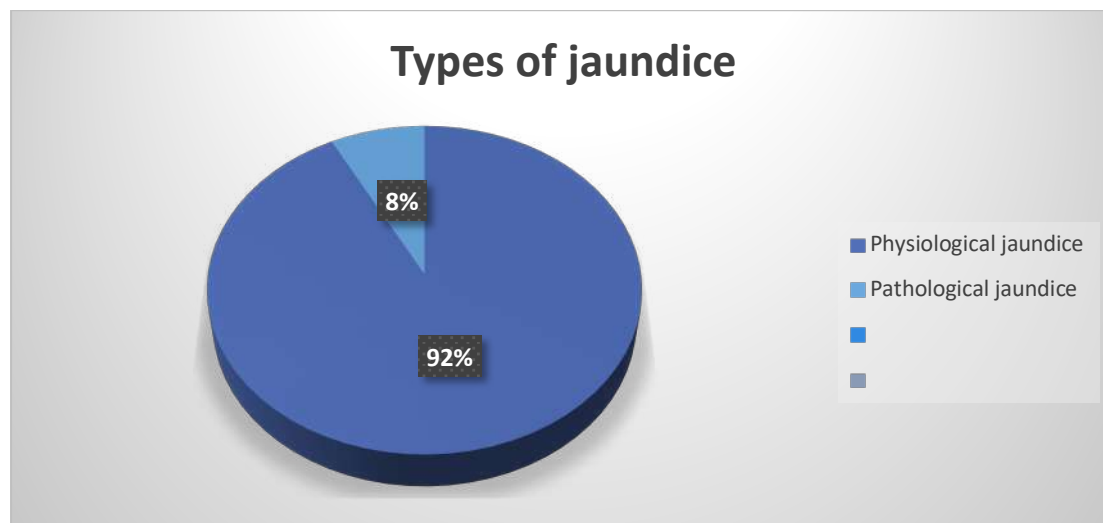


Figure 4.2: Show types of jaundice

Graph show level of severity of jaundice to neonates by the use of Cramer's rule

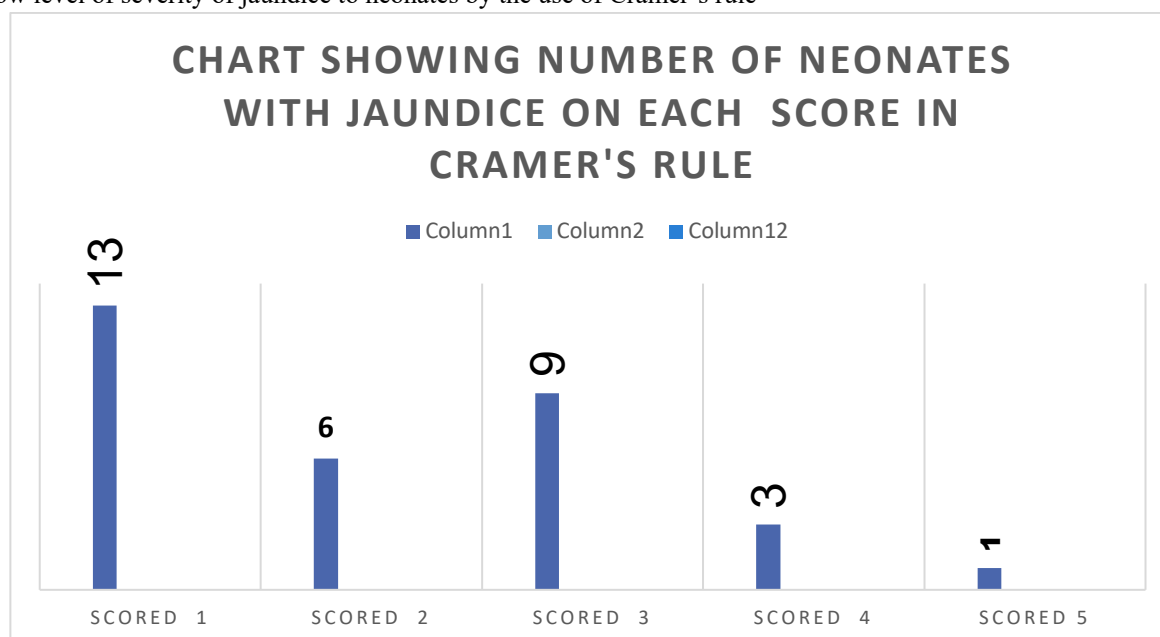


Table below show distribution of maternal risk factors

Maternal Risk Factors		Frequency (N=120)	Percentage
Antenatal infection	Present	31	25.83%
	Absent	89	74.17%
Frequency of breastfeeding in a day	<5 times	19	15.83%
	5-8 times	56	46.67%
	>8 times	45	38.50%
Mode of delivering	SVD	67	55.83%
	C/S	53	44.17%

Table below shows distribution of neonatal risk factors

Neonatal Risk Factors		Frequency (N=120)	Percentage
Gestation age at birth	Pre-term	32	26.67%
	Term	79	65.83%
	Post-term	9	7.50%
Birth injuries	Present	19	15.83%
	Absent	101	84.16%
Difficulty in breastfeeding	Present	27	22.50%
	Absent	93	77.50%
Neonatal Sepsis	Present	20	16.67%
	Absent	100	83.33%

BIVARIATE ANALYSIS (N=120)

Table 1: Shows factors associated with neonatal jaundice

VARIABLES	CATEGORY	Neonatal jaundice		P-VALUE AND CHI-SQUARE	
		Present	Absent		
MARITAL STATUS	Married	32	38	$X^2=31.169$	P=0.001
	Separate	0	50		
AGE OF MATERNAL	<18 years	9	0	$X^2=36.2$	P=0.001
	18-35 years	23	57		
	>35 years	0	31		
LEVEL OF EDUCATION	Primary	19	0	$X^2=70.807$	P=0.001
	Secondary	13	37		
	Tertiary	0	51		
OCCUPATION OF MOTHER	Formal	32	5	$X^2=97.887$	P=0.001
	Informal	0	50		
	Employed	0	33		
AGE OF NEONATE	0-7 days	25	0	$X^2=90.032$	P=0.001
	7-14 days	7	36		
	>14 days	0	52		
SEX OF NEONATE	Male	32	25	$X^2=48.23$	P=0.001
	Female	0	63		
BIRTH WEIGHT	<2500g	25	0	$X^2=87.637$	P=0.001
	2500-3500g	7	66		
	>35000g	0	22		
ANTENATAL INFECTION	Present	31	0	$X^2=114.94$	P=0.001
	Absent	1	88		
G.A	Pre-Term	32	0	$X^2=120$	P=0.001
	Term	0	79		
	Post-term	0	9		
MODE OF DELIVERY	SVD	32	35	$X^2=34.518$	P=0.001
	C/S	0	53		
BIRTH INJURIES	Present	19	0	$X^2=62.079$	P=0.001
	Absent	13	88		
	Present	0	27	$X^2=12.667$	P=0.001

DIFFICULT BREATHING	IN	Absent	32	61		
NEONATAL SEPSIS		Present	20	0	$X^2=66$	P=0.001
		Absent	12	88		
FREQUENCY OF BREASTFEEDING	OF	<5Times	19	0	$X^2=68.955$	P=0.001
		5-8Times	13	43		
		>8Times	0	45		

Table above shows bivariate analysis between neonatal jaundice and associated factors of neonatal jaundice. The above data shows all associated factors were significant, this means that any of factors may cause neonatal jaundice.

LINEAR REGRESSION

Table 2: Show linear regression results

VARIABLE	BETA COEFFICIENTS	P-VALUE
OCCUPATION OF MOTHER	.270	0.000
ANTENATAL INFECTION	.527	0.000
GESTATION AGE	.285	0.000

On linear regression results shows Occupation of Mothers of which most of them were merchant, also Ante-natal infection such as toxoplasmosis and gestation age most term mothers were significantly associated with neonatal jaundice.

Study Limitations

- ☐ Sample size selected was small due to limited short time of collecting data
- ☐ Bilirubin wasn't assessed due to lack of bilirubinometer
- ☐ Black skinned neonates were not easy to assess level of jaundice by the use of cramer's rule.

DISCUSSION

This study aimed to determine the prevalence and risk factors associated with neonatal jaundice at ARRH. Study enrolled a total of 120 participants. The Research was carried out over 60 days, from 22nd SEPTEMBER 2025 to 20th NOVEMBER 2025.

This study includes 120 neonates in total. Of these 32(26.67%) were diagnosed with neonatal jaundice. In Murekatete University of Rwanda was 44.3% and South Africa at National District in Bloemfontein by Brits et al, (2018) found prevalence of neonatal jaundice was 55.2%, Study conducted at Pakistan also showed prevalence of neonatal jaundice was 27.6% which were comparable my study.

The most associated factors of neonatal jaundice that appears to be leading cause of neonatal jaundice are occupation of mothers such as merchant, antenatal infection such as toxoplasmosis and gestation age in term mothers as can be seen on linear regression leadings are varied.

CONCLUSION

Almost 1 in 3 neonates delivered at Amana Regional Referral Hospital had neonatal jaundice with majority having physiological jaundice. The aim of the study was to determine the prevalence and risk factors associated with neonatal jaundice among newborns 0-28 days of life at ARRH. Prevalence of neonatal jaundice was 26.67%. There was a significant relationship between antenatal infections and mode of delivery with the occurrence of neonatal jaundice.



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