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RESEARCH ARTICLE

PREVALENCE AND RISK FACTORS OF PRETERM NEONATES ADMITTED IN THE NEONATAL WARD AT AMANA REGIONAL REFERRAL HOSPITAL FROM JULY TO DECEMBER 2021

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ABSTRACT

Preterm birth is one of the causes of neonatal morbidity and mortality, which makes it a very important topic for discussion and research. This study was conducted in Amana Regional Referral Hospital to determine the prevalence and risk factors of preterm admissions in the neonatal unit from July to December 2021. It was a retrospective study that involved data from 151 mothers of the preterm babies. The Statistical Package for the Social Sciences (Version 22) was used for data analysis. The statistical relationship between independent variables and PTB was studied by the Chi-square test in bivariate analysis and logistic regression in multivariate analysis. The prevalence of the preterm admissions was seen to be 23.2% which is higher compared to similar studies that were previously conducted. Several risk factors were also studied, the commonest risk factor found were multiple pregnancy 27.2%, hypertensive disorder 17.2 %, maternal infection 13.9% and premature rapture of membrane in 13.3%.Multiple pregnancy has shown a probability of 0.005 which is less than 0.05 which showed significant association between multiple pregnancy and prematurity. It is very important to know how information of PTB and its risk factors contributes to the scientific world. The results provide useful information to guide health professionals for monitoring preterm birth. According to the study, it has become well known that an improvement in facilities for premature care is required. Establishment of neonatal wards at level of district hospitals to ensure proper management of premature babies and higher rates of survival of the preterm babies.Address the preventable risk factor of preterm births in women who are in child bearing age, during ante natal visits in order to reduce percent of preterm births.

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INTRODUCTION

World Health Organisation (WHO) states preterm birth (PTB) as birth occurring within 20 weeks to< 37 weeks of gestationage . It can be further categorised as extreme PTB (<28 weeks), very PTB (28 - <32 weeks) and moderate PTB (32 - <37 weeks)(1). PTB is an important public health issue and clinical problem in neonatal medicine. It is the leading cause of high peri-natal and post-natal morbidity and mortality in the developed and developing countries (2).

Studies have found in developing countries, low-income countries, the main causes of PTB are infectious diseases and poor availability of health care resources. In contrast, developed countries and high-income countries PTB is allied to conception among older women and increased number of multiple pregnancies as a result of usage of fertility drugs. Medically unnecessary inductions and caesarean sections deliveries before full term also increase PTB. However, in rich and poor countries, many preterm births remain unexplained (3,4).

Pre-term labour resulting in PTB is considered as one of the foremost causes of prenatal and neonatal mortality. The probability of survival among preterm neonates rises with increasing gestational age at birth. In addition to the increase in neonatal mortality, the PTB babies are also at risk for physical and mental disorders and diseases with an exponential increase in expense to take care of PTB babies in the Neonatal intensive Care Units (NICU). Has been foundone of the most significant risk factors is the history of preterm delivery, which increases the risk of next preterm labour which should be the main goal of prevention (5). PTB can also be spontaneous or provider initiated such as induced. Spontaneous PTB is beginning of labour with intact or pre-labour rapture of membrane with birth before 37 weeks of gestation. Spontaneous onset of labour accounts for 65–70% of all preterm births and provider induced for 30–35% (6).

Several risk factors which have been elaborated for PTB can be categorised into non-modifiable and modifiable. Non-modifiable risk factors: risk factors which cannot be changed in order to reduce probability of PTB include age, ethnicity, blood pressure,

developmental abnormalities in fetus, placenta previa, uterine fibroid, diabetes, blood clotting diseases and bleeding from the vagina. Modifiable risk factors: risk factors which can be changed to reduce probability of PTB such as lifestyle and environmental factors like late or no health care during pregnancy, exposure to certain environmental pollutants, smoking, alcohol, illegal drugs, domestic violence, lack of social support, stress and long working hours (7). Other risk factors which should not be ignored are certain medical conditions such as urinary tract infections, sexually transmitted infections, vaginal infection such as bacterial vaginosis and bacterial trichomoniasis, gestational diabetes and diabetes mellitus (8).

South Asia and Sub Saharan African contribute to >60% of the annual PTB recorded globally. In Tanzania, an estimate of 2 million births are recorded annually of which 11% of the babies at PTB. PTB in Tanzania also accounts for 10% of under-five mortality (9). Information on prevalence and risk factors on PTB are important to clinicians, nurses and researchers that would guide in developing a focused intervention to prevent PTB and its associated consequences. This would also contribute towards Sustainable Development Goals 3.2 which is to end preventable deaths of new-borns and children under 5 years. If the problem is not addressed extensively, it will affect a large population of the pregnant mothers, new-borns with associated consequences, and community at larger. Currently, the government and ministry of health are working hard to ensure the reduction of under 5 years mortality rate; by conduction nationwide vaccination programs and supplements, however, the coverage of basic emergency obstetric and new-born care is low with only 20% of dispensaries and 39% health centres offering delivery services that provide all signal functions(10). Therefore, this study adds more recent information on the prevalence and risk factors of preterm neonates admitted at Amana Regional Referral Hospital. This will provide an opportunity for improvement of neonatal care and maternal care through formulation and awareness of risk factors and provision of preventative measures to the mothers and the health care professionals.

LITERATURE REVIEW

Prevalence of preterm births: Out of 130 million babies born per year; an approximate of 15 million babies annually are born as preterm neonates calculating the prevalence at 11.5%. That is an estimate of 1 in 10 babies globally (3). Approximately 1 million children die each year due to complications of PTB. The babies who survive the PTB, associated consequences include a lifetime of disability, including learning disabilities and visual and hearing problems. According to WHO, prematurity is the leading cause of death in children under 5-years, however inequality of survival rates around the world differ. More than 60% of preterm births occur in South Asia and Sub Saharan Africa. In the lower-income countries the prevalence of PTB stands at 12% with prevalence of PTB in high-income countries is 9%(11). More than half the preterm neonates born in low-income settings of extremely preterm and very preterm status die due to socio-economic burden on the parents. Lack of feasible and cost-effective care, breastfeeding support, and basic care for infections and breathing difficulties contribute majorly to the high mortality in preterm neonates. In high-income countries, the survival of preterm neonates are high due to use of technology in middle-income settings, however, this is causing an increased burden of disability among preterm babies who survive the neonatal period(12). In developed countries such as the UK 2016, approximately 7.8% of babies were born preterm nationally and prematurity related conditions accounted for more than half of all neonatal deaths. Infant mortality rates tend to be substantially higher among preterm neonates 21 deaths per 1000 live births compared with full term neonates with 1.4 deaths per 1000 live births(13). PTB is associated to various maternal genetic such as ethnicity and socio-economic status. A study conducted in disadvantage areas in the UK, report a prevalence of preterm birth of 8.3% with Black Caribbean and Black African mothers had a high risk of delivering PTB than Caucasians mothers (14). A study conducted in Brazil reported 11.5% prevalence of PTB with 60.7% spontaneous onset of labor and 39.3% provided initiated with induction. The study reported socio-demographic factors associated with spontaneous PTB which were teen-pregnancy, low level of education, and inadequate prenatal care. Other risk factors were history of PTB, multiple pregnancy, infections during pregnancy and abruption placenta (15).

In contrast in under-developed countries the prevalence of PTB is relatively higher compared to developed countries. An observation study conducted in 12 public hospitals of Nepal reporting an incidence of PTB of 93 per 1000 live births. High incidence of PTB was reported in Nepal with multiple correlation socio-demographic, obstetric and neonatal risk factors (16). Cross-sectional study conducted in three hospitals of Addis Ababa's public hospitals NICU reported a 16.15% (n=3732/23115). 66.1% of PTB were spontaneous and 33.9% were induced PTB. Hypertension during pregnancy and maternal HIV infection were significantly associated with spontaneous PTB(6). Within the Sub Saharan Africa multiple studies have reported prevalence and risk factors of PTB. A cross sectional descriptive study was conducted in the maternity unit of Kenyatta National Hospital in Nairobi, Kenya in 2013. A total of 18.3% prevalence of PTB was recorded which should significant associated with maternal age, multiple parity, previous PTB, induced hypertension, prolonged prelabour rupture of membranes and urinary tract infections(11). Compared to Kenya as a Sub Saharan country, Tanzanian is among the top ten countries with the highest number of PTB with 11 per 100 live births (10). Other studies in Tanzania have reported prevalence between 10% to 16.7% which are about twice the figures of the prevalence of PTB in developed countries(17,18). Similar to most developing countries, high number of neonate deaths can be significantly reduced upon prevention of preterm deliveries.

Risk factors of preterm births: A study in Yemen determined the risk factors associated with PTB where risk factors were statistically analysed to demonstrate contribution of increased PTB from modifiable or non-modifiable risk factors. The risk factors with statistically significant association with PTB were family history of PTB, preeclampsia, multiparity, premature rupture of membranes and abnormal amniotic fluid volume. The recognition that however, modifiable risk factors have a huge contribution, non-modifiable risk factors have a huge impact with statically significance and that early recognition of preterm risk factors will help healthcare professionals identify high-risk pregnancy and take effective measure(19). A study in northern Ethiopia in 2018 analysed the factors associated with PTB revealing that mothers who lived in rural area were twice more likely to have PTB compared to mother who reside in urban areas. It also showed that inter-pregnancy intervals of less than 24 months mothers were more likely to have PTB than mothers with inter-pregnancy intervals of more than 24 months. These risk factors are socio-demographic risk factors which can be modified, showing there is a contribution of modifiable risk factors which can be avoided to prevent PTB. In addition, the study also showed that medical factors such as malarial infection during pregnancy were statistically significant in increasing the probability of PTB(20).

Taha et al., 2020 conducted a study in Abu Dhabi, United Arab Emirates which reported a 6.3% PTB rate. Factors that were positively associated with PTB included maternal education level; statistically significant under secondary education, provider initiated caesarean. This demonstrates that socio-economic contributions to PTB(21). Assessment of risk factors for PTB in population with high incidence of preterm birth in Malawi. The study found that weight gain and appropriate BMI has a protective effect. Previous PTB has twice the probability of suffering. Persistent malaria and anaemic also demonstrates the same probability which increases the risk of late PTB. Mothers of under 20 years have a significant association with PTB. This shows similar results to the above studies that modifiable and non-modifiable risk factors contribute the PTB(22). A study conducted in Kenyatta National Hospital in Kenya reported significant association with non-modifiable risk factor and PTB such as maternal age of 20 years and younger, multiparity, induced hypertension, antepartum haemorrhage, prolonged prelabour rupture

of membranes and urinary tract infections were significantly associated with PTB. However, modifiable risk factors such as marital status, level of education, smoking, alcohol use, antenatal clinic attendance, interpregnancy interval of 24 months and HIV status did not significantly contribute to the increase probability of PTB(11).

A study conducted Tanzania analysed the factors associated with risk of PTB in Muhimbili National Hospital. It was shown that maternal type of employment, previous PTB, previous spontaneous abortion, uterine scar, number of antenatal care visits, placenta previa, bleeding during second trimester and maternal anaemia were associated with PTB. It was suggested that close monitoring of pregnant women who present any of risk factor associated with PTB so as to prevent morbidity and mortality of the preterm neonates in Tanzania(23). Tanzania is among the countries with the highest number of PTB of which such delivers contribute to the number of neonatal deaths. It is important to identify the high-risk pregnancy with PTB to be able to assess appropriate and relevant interventions that can be employed to reduce the burden of PTB. The purpose of this study is to determine the prevalence and risk factors of the preterm neonates admitted at Amana Regional Referral Hospital.

Research Questions of The Study: What is the prevalence of premature admissions at the neonatal ward at Amana Regional Referral Hospital?

- What are the maternal risk factors of preterm deliveries among mothers of premature neonates admitted at the neonatal ward at Amana Regional Referral Hospital?
- What are the fetal risk factors of prematurity among premature neonates admitted at the neonatal ward at Amana Regional Referral Hospital?

Research Aims and Objectives

Broad Objectives: To determine the prevalence and risk factors of the preterm neonates admitted at Amana Regional Referral Hospital from July to December 2021.

Specific Objectives

- To determine the prevalence of preterm neonates admitted at the neonatal ward at Amana Regional Referral Hospital.
- To identify maternal risk factors of preterm deliveries among mothers of premature neonates admitted at the neonatal ward at Amana Regional Referral Hospital.
- To identify fetal risk factors of prematurity among premature neonates admitted at the neonatal ward at Amana Regional Referral Hospital.

METHODOLOGY

Study Area: The research was conducted in the neonatal ward at the Amana Regional Referral hospital, which is in Ilala district of Dar es salaam, Tanzania. Ilala is one of the districts in Dar es salaam, the others being Temeke to the south and Kinondoni to the north. According to the 2012 National Tanzania Census, the population for Ilala district is 1,220,611 with 595,928 males and 624,683 females (Tanzania census, 2012). The neonatal ward at Amana Regional referral hospital which was our data collection point, has a daily census of around 50 to 80 neonates per day and has a total of around 400 neonatal admissions per month. The capacity of the neonatal ward is 82 beds. Amana Regional Referral hospital has several health departments including medicine and surgery and provide various healthcare services as well as room for medical students to learn and practice their clinical skills.

Target Population: People of Ilala District in Dar es salaam, Tanzania. Ilala district having a population of 1,220,611 (24).

Study Population: This study involved mothers of neonates as well as the neonates admitted in the neonatal ward at the Amana Regional Referral hospital during the duration of the study.

Eligibility Criteria

Inclusion Criteria: Hospital files of preterm neonates (born before 37 completed weeks of gestation) that contained demographic, prenatal as well as some useful postnatal information of their mothers from hospital records.

Exclusion Criteria

- Hospital files of neonates born term (after 37 weeks of gestation)
- Hospital files of preterm neonates (born before 37 completed weeks of gestation) that did not contain or contained extremely minimal prenatal & postnatal information of their mothers.

Study Design: A hospital based quantitative retrospective study of women with neonates during the study period at Amana Regional Referral hospital from July to December 2021 to determine the prevalence and risk factors of the premature neonates admitted.

Sampling Method: Purposive sampling technique was used until the calculated sample size was reached.

Sample Size Determination: The sample size for this study was calculated from;

$$n = \frac{z^2 P(1-P)}{e^2}$$

Where;
Z= 95% confidence interval (z value is 1.96)
P= Prevalence (11%) – According to Tanzania profile of preterm and low birth weight prevention and care, 2017)
E= Margin of error= 5% (0.05)
N= Sample size

$$n = \frac{(1.96)^2 0.11(1-0.11)}{0.05^2}$$

N= 150.43 ~ 150

Therefore, estimated sample size was150 preterm neonates from the neonatal ward at Amana Regional Referral Hospital, data was obtained from 151 instead.

Study Variables

The study variables during this study were;

Dependent variable

- Premature admissions

Independent Variables

(National guidelines Tanzania, 2019)

- Maternal age
- Antenatal care
- Premature rupture of membranes
- Urinary tract Infections during pregnancy
- Antepartum hemorrhage
- Hypertensive disorders (pre-eclampsia/eclampsia)
- Multiparity
- Multiple pregnancies
- Gender of the preterm neonate
- Birth weight of the preterm neonate

Data Collection Tools And Method

Data Collection Method

A data collection form was prepared in which data was filled in by the principal investigator and research assistant from patient files.
The data collection form comprised the demographic data, birth history including the antenatal history as well as other risk factor related questions. The data collection form has been attached in this report.

Data Collection Tools

- Data collection forms printouts
- Pens

Data Management and Analysis Plan

Data Management: *Statistical data was analyzed using SPSS software version 22.0 (SPSS, Inc, Chicago, IL, USA).*

Data Analysis Plan: Data collected was coded and entered into the computer using SPSS software version 22.0 (SPSS, Inc, Chicago, IL, USA). Data cleaning was done through the same software. Categorical variables were summarized using frequencies and proportions. Continuous variables were summarized using descriptive statistics by the measures of central tendency and measures of dispersion such as mean with standard deviation (SD).

Ethical Issues

Ethical Clearance: The ethical clearance for this research was obtained from the Dean of Faculty of medicine at the Hubert Kairuki Memorial University.

Study Limitations: During my research study, I encountered the following limitation; Being retrospective study there was some missed data from files some information were inadequately filled.

RESULTS

The results obtained from the study are as follows

Prevalence of the preterm neonates

The prevalence of preterm neonates at Amana Regional Referral hospital was calculated using the total number of preterm neonates admitted in the neonatal ward over the total number of neonates admitted in the same ward over a period of 6 months. The data is shown in Table 1.1

Table 1.1. Table showing data on number of preterm and total admissions from July to December 2021

MONTH - 2021	PRETERM ADMISSIONS	TOTAL ADMISSIONS
July	92	344
August	84	319
September	79	355
October	79	316
November	72	373
December	75	365
TOTAL	481	2072

$$\text{Prevalence} = \frac{\text{Total number of preterm admissions in the neonatal ward at ARRH}}{\text{Total number of neonatal admissions in the neonatal ward at ARRH}} \times 100$$

$$\text{Therefore prevalence} = \frac{481}{2072} \times 100 = 23.2\%$$

Comparing gestational age at birth of the preterm neonates

- The subjects were grouped into 4 categories, born at different weeks of gestation; less than 30 weeks (which is 28-29 weeks in our setting), 30-32 weeks, 33 - 35 weeks and 36 weeks.
- Out of which, an observation was made that we had a total number of 19/151 preterm neonates admitted that were under 30 weeks which is 12.58% out of which males were 8/19 (42.1%) and females were 11/19 (57.9%). The mean birth weight for preterm neonates in this category was 1.27kgs. (Table 2.1, Chart 2.1)
- Preterm neonates born between 30 and 32 weeks were 49/151 which is 32.45% out of which 26 were males (53.1%) and 23 were females (46.9%). The mean birth weight for the preterm neonates in this category was 1.44kgs. (Table 2.1, Chart 2.1)
- Preterm neonates born between 33 and 35 weeks were 63/151 which is 47.12% - being the highest, out of which 36 were males (57.1%) and 27 were females (42.9%). The mean birth weight for the preterm neonates in this category was 1.73kgs. (Table 2.1, Chart 2.1)
- Finally, the preterm neonates born at 36 weeks of gestation alone were 20/151 which is 13.24% out of which 12 were males (60.0%) and 8 were females (40.0%). The mean birth weight for the preterm neonates in this category was 1.77kgs. (Table 2.1, Chart 2.1)
- It was also observed, that initially (at less than 30 weeks) there were more females than males, and as weeks went by, the number of male preterm babies overnumbered the females. i.e at <30 weeks, 8 males, 11 females (females greater than males by 15.8%), at 30-32 weeks, 26 males, 23 females (males greater than females by 6.2%), at 3-35 weeks, 36 males, 27 females (males greater than females by 14.2%), and finally at 36 weeks, 12males, 8 females (males greater than females by 20%), we can clearly see the rise here (Table 2.1, Chart 2.2).

Table 2.1. Table comparing gestational age at birth and number of preterm neonates born

Gestational age at birth (weeks)	Sex		Total Number	Mean birth weight
	M	F		
<30 weeks	8 (42.1)	11 (57.9)	19	1.27
30 - 32 weeks	26 (53.1)	23 (46.9)	49	1.44
33 - 35 weeks	36 (57.1)	27 (42.9)	63	1.73
36 weeks	12 (60.0)	8 (40.0)	20	1.77
			Total 151	

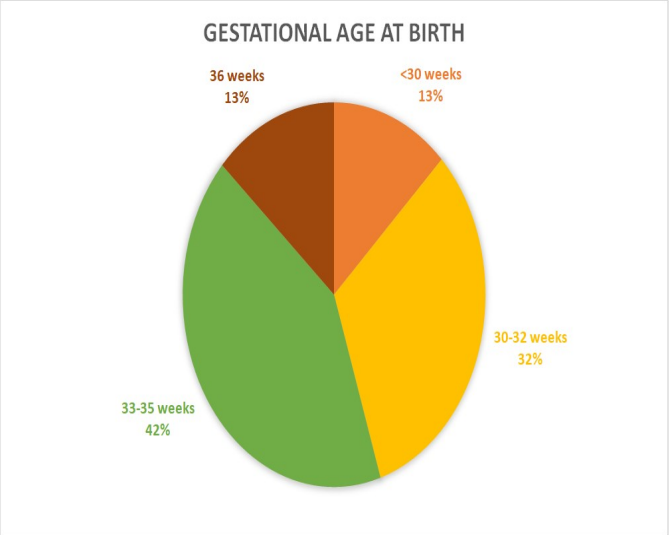

Chart 2.1. Pie chart showing proportion of preterm births during different weeks of gestation

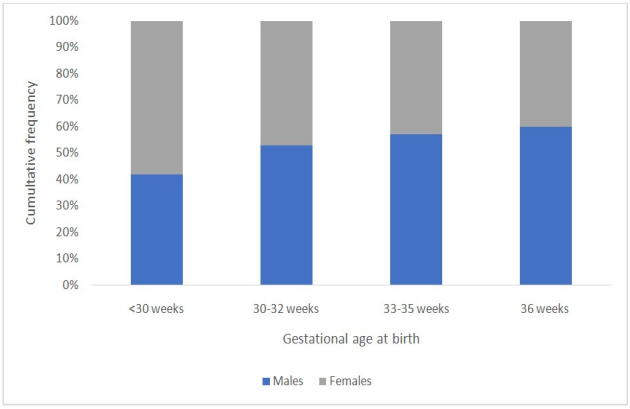

Chart 2.2. Histogram showing gestational age at birth and cumulative frequencies of both; preterm males and females

Risk factors of preterm admissions

In this study, the risk factors of preterm admissions were the following

- Attending antenatal clinics – Mothers of the preterm neonates who attended antenatal clinic were 137/151 (90.7%), and those who did not attend the antenatal clinic were 14/151 (9.3%) (Table 3.1).
- Presence of infection such as UTI or bacterial vaginosis was present in 21/151 mothers during pregnancy (13.9%) and was not present in 130/151 (86.1%) (Table 3.1).
- Preterm Premature rupture of membranes occurred in 20/151 mothers (13.3%) and did not occur in 113 mothers (74.8%). Data was unavailable from 18 subjects (11.9%) (Table 3.1).
- Hypertensive disorder such as preeclampsia was present in 26/151 mothers (17.2%) and was not present in 120/151 mothers (79.5%). Data was unavailable from 5 subjects (3.3%) (Table 3.1).
- Multiple pregnancy was present in 41/151 mothers (27.2%) and was not present in 110/151 (72.9%) (Table 3.1).
- Cervical incompetence was not present in 8 mothers (5.3%). The data was unavailable for the remaining 143/151 (94.7%) (Table 3.1).
- Antepartum Hemorrhage was present in 12/151 mothers (7.9%) and was not present in 25/151 mothers (16.6%), data from 114/151 mothers were not available (75.5%) (Table 3.1).
- Multiparity; 89/151 mothers (58.9%) were multiparous women and 62/151 (41.1%) mothers were primiparous (Table 3.1).
- Maternal age; the women were grouped into one of the 5 categories; <20 years, <25 years, <30 years, <35 years and <40 years. It was seen that women between the age of 20 and 25 had the highest percentage of preterm delivery, and women between 35 and 40 years had the least percentage of preterm delivery (Table 3.2 & Chart 3.1).

Table 3.1 –Table showing presence of risk factors of preterm admissions in this study

Risk Factors	Yes	No	Data Unavailable
Attending Antenatal Clinic	137 (90.7)	14 (9.3)	-
Presence of Infection	21 (13.9)	130 (86.1)	-
Premature rupture of membrane	20 (13.3)	113 (74.83)	18 (11.9)
Hypertensive disorder	26 (17.2)	120 (79.5)	5 (3.3)
Multiple pregnancy	41 (27.2)	110 (72.9)	-
Cervical incompetence	-	8 (5.3)	143 (94.7)
Antepartum Hemorrhage	12 (7.9)	25 (16.6)	114 (75.5)
Multiparity	89 (58.9)	62 (41.1)	-

Table 3.2. Table showing maternal age and frequency of preterm births

Maternal age	Frequency
<20 years	26 (17.2)
<25 years	52 (34.4)
<30 years	43 (28.5)
<35 years	19 (12.6)
<40 years	11 (7.3)

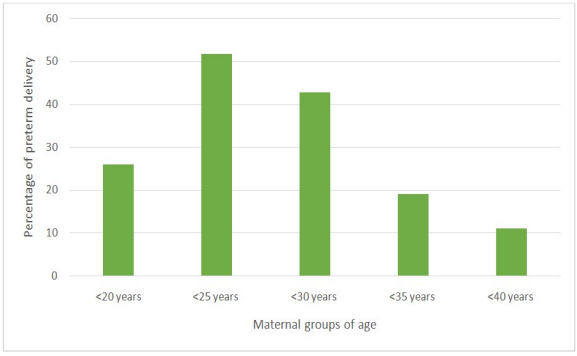

Chart 3.1. Bar graph showing maternal age and the percentages of preterm births in each age category

Risk factors and significance

- Antenatal clinic visits has shown a probability of 0.568 which is greater than 0.05 which showed no significant association between the antenatal clinic visits and prematurity (Table 3.3).
- Maternal age has shown a probability of 0.303 which is greater than 0.05 which showed no significant association between thematernal age and prematurity (Table 3.3).
- Presence of infection such as UTI and bacterial vaginosis has shown a probability of 0.962 which is greater than 0.05 which showed no significant association between the presence of infection and prematurity (Table 3.3).
- Preterm PROM has shown a probability of 0.505 which is greater than 0.05 which showed no significant association between preterm PROM and prematurity (Table 3.3).
- Hypertensive disorder has shown a probability of 0.282 which is greater than 0.05 which showed no significant association between having a hypertensive disorder and prematurity (Table 3.3).
- Multiple pregnancy has shown a probability of 0.005 which is less than 0.05 which showed significant association between multiple pregnancy and prematurity.
- Antepartum hemorrhage has shown a probability of 0.338 which is greater than 0.05 which showed no significant association between the antepartum hemorrhage and prematurity (Table 3.3).
- Multiparity has shown a probability of 0.136 which is greater than 0.05 which showed no significant association between multiparity and prematurity (Table 3.3).

DISCUSSION

Prevalence of Preterm admissions: In this study, preterm admissions constituted 23.2% of all admissions at the neonatal ward at Amana Regional Referral Hospital. This is reported greater prevalence compared to 18.3% in a study conducted in Bugando Medical Centre in 2014. Multisite, retrospective, cohort study conducted in Kenya in 2021, the findings reported 30% out of 84% of neonatal admissions were contributed by preterm. The lower percentage in our regional hospitalmay be explained by the referral nature of the study setting where with women with a higher risk of medical and obstetric complications who are referred to Muhimbili National hospital(MNH) for further advanced management and care. Likewise, preterm of <28 weeks GA are referred to MNH due to lack intensive care unit for neonates.

Table 3.3. A 3X2 chi squared table showing data on risk factors of preterm admissions as well as their probabilities from this study

Chi-square				
Antenatal Clinic	**Yes**	**No**	**Probability**	
<30 weeks	30 (29.0)	2 (3.0)	0.568	
31-35 weeks	90 (89.8)	9 (9.2)		
36 weeks	20 (20.0)	3 (1.9)		
Maternal Age	**Under 20 years**	**Above 20 years**	**Probability**	
<30 weeks	14 (15.5)	18 (16.5)	0.303	
31-35 weeks	52 (47.9)	47 (51.1)		
36 weeks	7 (9.7)	13 (10.3)		
Infection	**Yes**	**No**	**Probability**	
<30 weeks	4 (4.5)	28 (27.5)	0.962	
31-35 weeks	14 (13.8)	85 (85.2)		
36 weeks	3 (2.8)	17 (17.2)		
PROM	**Yes**	**No**	**N/A**	**Probability**
<30 weeks	4 (4.2)	26 (23.9)	2 (3.8)	0.505
31-35 weeks	15 (13.1)	70 (74.1)	14 (11.8)	
36 weeks	1 (2.6)	17 (15.0)	2 (2.4)	
Hypertensive disorder	**Yes**	**No**	**N/A**	**Probability**
<30 weeks	8 (5.5)	23 (25.4)	1 (1.1)	0.282
31-35 weeks	15 (17.0)	82 (78.7)	2 (3.3)	
36 weeks	3 (3.4)	15 (15.9)	2 (0.7)	
Multiple pregnancy	**Yes**	**No**	**Probability**	
<30 weeks	2 (8.7)	30 (23.3)	0.005	
31-35 weeks	30 (26.9)	69 (72.1)		
36 weeks	9 (5.4)	11 (14.6)		
Antepartum Hemorrhage	**Yes**	**No**	**N/A**	**Probability**
<30 weeks	5 (2.5)	3 (5.3)	24 (24.2)	0.338
31-35 weeks	6 (7.9)	19 (16.4)	74 (74.7)	
36 weeks	1 (1.6)	3 (3.3)	16 (15.1)	
Multiparity	**Yes**	**No**	**Probability**	
<30 weeks	16 (18.9)	16 (13.1)	0.136	
31-35 weeks	64 (58.4)	35 (40.6)		
36 weeks	9 (11.8)	11 (8.2)		

Multivariate analysis

Source	SS	df	MS	Number of observations	151
				F(8,142)	1.6
Model	4.22923111	8	0.528654	Prob > F	0.1288
Residual	46.8171265	142	0.329698	R-squared	0.0829
				Adj R-squared	0.0312
Total	51.0463576	150	0.340309	Root MSE	0.57419

Tables 3.4 and 3.5 – Tables showing multivariate analysis

Gestational Age (in weeks)	Co-efficient	Standard Error	t value	P>t	[95% Confidence interval	
Antenatal visit	-0.2	0.2	-1.16	0.247	-0.549375	0.14244
Maternal Age (years)	0.0	0.1	0.37	0.716	-0.155903	0.226554
Presence of Infection	0.1	0.1	0.38	0.708	-0.219689	0.322687
PROM	0.0	0.1	0.12	0.905	-0.147575	0.166667
Hypertensive disorder	0.0227886	0.098768	0.23	0.818	-0.172457	0.218034
Multiple pregnancy	0.3578133	0.106476	3.36	0.001	0.147331	0.568296
Antepartum hemorrhage	-0.0324152	0.063539	-0.51	0.611	-0.158019	0.093189
Multiparity	-0.029448	0.096706	-0.3	0.761	-0.220617	0.161721
Constants	1.628628	0.445179	3.66	0	0.748594	2.508662

This is important as calls for well-equipped neonatal units in the regional referral hospitals to manage babies from 24 weeks onward but the study setting is only equipped to manage neonates above 28 weeks. This discrepancy is also reported as definitions of preterm births in developed and developing countries are different(26). It was also seen that the highest number of preterm neonates admitted were of 33-35 weeks (63/151) and the lowest being less than 30 weeks (19/151), as seen in table 2.1 and chart 2.1. There were more preterm males than females in the current study, which are similarly reported in multiple studies conducted in developed and developing countries. However, this is not scientifically proven but research suggests sex of the fetus is associated with the mechanism that initiates labor(27). Additionally, our study follows the suggested proportion of more male preterm than females, however our study reports a greater percentage of female preterm births in the early preterm (<30 weeks), and as weeks go by, the higher number of preterms are the males (chart 2.2).

Risk Factors of Preterm Admissions: In this study, the women were grouped into one of the 5 categories; <20 years, <25 years, <30 years, <35 years and <40 years. It was seen that women between the age of 20 and 25 had the highest percentage of preterm delivery, and women between 35 and 40 years had the least percentage of preterm delivery. The preterm neonates with mothers below 20 years of age were 26/151 (17.2%) (Table 3.2 & Chart 3.1). Maternal age below 20 years had no significant association with preterm births as opposed to a study in Malawi in 2014 in which mothers below 20 years of age had a significant association with preterm birth(22). A study conducted in Kenyatta National hospital in 2018 also showed significant association of maternal age under 20 years and preterm births.(11). The data form our study revealed that multiple pregnancy was the only statistically significant risk factor for PTB with p value of 0.005. Having visited antenatal clinic during pregnancy, maternal age, presence of infection such as UTI and bacterial vaginosis, PROM,

hypertensive disorder during pregnancy, antepartum hemorrhage and multiparity existed in some women who gave birth to premature babies but had no statistical significance to preterm births in our study. As opposed to a study conducted in Yemen in 2018 which revealed that preeclampsia and multiparity also had a significant contribution to preterm births, they further explained that a family history of PTB and an abnormal amniotic fluid volume also had a significant contribution to PTB, these risk factors could be looked upon in future studies(19).The multivariate analysis also shows that the only significant risk factor contributing to the preterm admission is multiple pregnancy as shown on table 3.4 and 3.5. The other risk factors investigated in our study are no significant which could be attributed to the significant data unavailable such as 11.9% (18/151) for PROM, 3.3% (5/151) for hypertensive disorder, 94.7% (143/151) for cervical incompetence and 75.5% (114/151) for antepartum Hemorrhage. In addition, most of the severe cases were immediately referred to Muhimbili National Hospital, thus reducing the number of positive risk factors affecting the significance of data.

CONCLUSION

This study has found necessary information on current prevalence of preterm births and commonest risk factors for preterm birth at our hospital. Based on these findings we will be in position to address every preventable risk factor at our hospital, region and country as the whole. We recommend establishment of neonatal wards at level of district hospitals to ensure proper management of premature babies and higher rates of survival of the preterm babies. Address the preventable risk factor of preterm births in women who are in child bearing age, during ante natal visits in order to reduce percent of preterm births. Data will be useful in reduction of the occurrence of preterm births, preterm morbidity and mortality

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