Research Article

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Preterm Delivery and Associated Factors Among Women Who Delivered Live Babies at Muhimbili National Hospital, Dares Salaam, Eastern Tanzania.

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Abstract

Background: *Preterm delivery is a major global health concern that continues to be a primary focus in obstetric and pediatric units in Sub-Saharan Africa. It is the leading cause of death in children under the age of five worldwide, with rates greater in sub-Saharan African nations, accounting for 16% of all fatalities and 35% of newborn infant deaths.*

Objective: *To investigate the magnitude of preterm delivery and its associated factors at Muhimbili National Hospital, a tertiary health facility in Tanzania.*

Methodology: *A hospital-based cross-sectional study was undertaken at Muhimbili National Hospital's maternity ward. 422 mothers were interviewed using a face-to--to-face structured questionnaire. The strength of association between the independent and dependent variables was determined using a logistic regression model.*

Results: *In this study, the proportion of mothers who had preterm delivery was 19.91%. Previous preterm delivery (aOR=5.4,95% CI 2.53-11.34),short Interpregnancy interval (aOR=3.0, 95% CI 3.08-9.03), ANC follow-up <4 contacts (aOR = 3.0, 95% CI 1.79-8.38), hypertensive disorders (aOR = 10.8, 95% CI 5.75, 18.33), antepartum hemorrhage (aOR = 14.5, 95% CI 4.92-24.27), preterm rupture of membrane (aOR =5.9,95% CI 1.94-14.12), multiple pregnancy (aOR =10.7,95% CI 10.21-92.69) and urinary tract infection (aOR =3.1, 95% CI 1.94-8.15) were independent factors associated with preterm delivery.*

Conclusions: *19.9% of women had preterm delivery. History of previous preterm delivery, short Interpregnancy interval, ANC follow-up <4 contacts, multiple gestation, urinary tract infections, pregnancy, hypertensive disorders, antepartum hemorrhage and preterm rupture of membranes were independent factors associated with preterm delivery.*

1. Introduction

Preterm delivery is defined by the World Health Organization as all deliveries occurring before 37 completed weeks of pregnancy, or within 259 days after a woman's last menstrual period. Preterm delivery is further sub classified into mild preterm (34-36weeks), moderate preterm (32-33weeks), and severe preterm (28-31weeks) [1- 4]. Preterm newborns' outcomes and prognosis are now linked to their gestational age and birth weight at birth. Preterm delivery occurring between 28 and 31 weeks of pregnancy is considered as severe or very preterm, accounting for 1% of all preterm births [5].

After the WHO released global rates of preterm delivery, it became a global and public health priority [6]. Around 15 million babies are born preterm each year, accounting for 11.1% of all live births worldwide, ranging from 5% in various European nations to 18% in some African countries. More than 60% of preterm newborns are born in South Asia and Sub-Saharan Africa, which account for 52% of all live births worldwide [7]. Preterm delivery complications are the top cause of mortality

in children under the age of five worldwide, accounting for around 16% of all fatalities and 35% of deaths among newborn newborns.

According to reports from a number of high-income and high-middle-income nations, preterm birth rates are on the rise worldwide, ranging from 5 to 7% in affluent countries and substantially higher in underdeveloped countries. Surviving preterm newborns are more likely to experience a range of short and long-term morbidities. Respiratory distress syndrome, bronchopulmonary dysplasia, necrotizing enterocolitis, sepsis, periventricular leukomalacia, seizures, intraventricular hemorrhage, cerebral palsy, infections, feeding difficulties, hypoxic ischemic encephalopathy, and visual and hearing impairment are all common complications experienced by preterm newborns. Preterm delivery is also attributed to large resource expenses for health systems, and families with preterm babies frequently face major psychological, emotional, and financial consequences [8].

Tanzania like other sub-Saharan countries, is reported as among the top ten countries with the highest number of preterm deliveries worldwide with an estimated number of over 300,000 per year with an estimated prevalence of 16.6% [9].Preterm delivery is therefore a critical global health issue that continues to be a great concern for obstetric and pediatric units, particularly in Sub-Saharan Africa, and must be addressed in order to minimize newborn and child mortality and achieve the Sustainable Development Goals [10- 12]. In Sub-Saharan countries, the attention given to preterm delivery is less and significant effort are emphasized in the care of premature infants but not in reducing the proportion of preterm delivery which is generally on the rise [13].

Regardless of the burden, Tanzania like other developing countries, has limited studies locally and therefore, little is known about the burden and factors contributing to preterm delivery in the country. Therefore, the current study was intended to determine the magnitude of preterm delivery and the associated factors at Muhimbili National Hospital, tertiary hospital in Tanzania.

2. Materials and Methodology

2.1. Study Design

A hospital-based cross-sectional study was conducted at Muhimbili National Hospital's maternity unit (MNH).

2.2. Study Duration

The study was conducted from 9th August to 30th October, 2021.

2.3. Study Setting

The study was conducted at MNH, the largest tertiary National referral hospital in Tanzania, which serves as a teaching hospital and research facility for Muhimbili University of Health and Allied Science (MUHAS) and Other Medical Training Colleges. It offers specialized obstetric services and care for Dares Salaam, capital city and suburban population of about 4364541millions people [14]. The hospital comprises a maternity unit block with four wards for neonatal and postnatal care, each of which houses 40 women, a maternity high depending unity, an intensive care unit, and labor ward. It attends high risk pregnancies which end up in preterm delivery such as women with severe forms of hypertensive disorders in pregnancy.

Muhimbili National Hospital maternity unit receives women directly from home and those who are referred from almost all regional and district hospitals residing in Dares Salaam and other regions in Tanzania. The Labor wards can have four rooms which conduct between 16 to 20 deliveries per day, over 600 deliveries per month, and over 7000 deliveries annually. All women who delivered at MNH, their data were captured in an electronic health record system. MNH also has a special neonatal intensive care unit (NICU) which offers specialized neonatal care to premature newborns and sick babies delivered at MNH and those referred from other facilities for specialized care.

2.4. Study Population

The study population comprised of all women who had live births at Muhimbili National Hospital (MNH) during the study period.

2.5. Sample Size

The sample size was determined by using the modified Kish and Leslie single proportion formula by considering the 95% confidence interval and 0.04 degree of accuracy, and the proportion of preterm birth from Chawanpaiboon et al., 2019, which was 16.6% as the overall prevalence of preterm delivery in Tanzania. By adding a 10% non-response rate, the final minimum required sample size was 422 women included in the study.

2.6. Inclusion Criteria

All mothers who had a live birth at MNH at GA of 28, completed weeks and above, and consented to participate were enrolled in the study.

2.7. Exclusion Criteria

All mothers who had a live births at MNH who were too sick and unable to consent.

2.8. Sampling Procedure

Systematic random sampling strategy was used to select study participants who met the inclusion criteria, During the study period MNH labor ward was conducting an average of 16 deliveries daily of live births, which is equivalent to around 480 deliveries per month. The sampling interval was calculated by dividing the 480 women who had a live baby in a month by the minimum adjusted sample size. The first participant to be included in the study was chosen randomly through a lottery by blindly picking one of the five pieces of paper named for the first five mothers in each day and then every second woman who gave birth after that was added to the study until the target sample size was reached. Gestational age of the newborn was calculated based on mother LMP or early ultrasound results. Ballard score, which was available in the neonatal unit, was used for calculation of age of the baby when the mother did not

remember her last day of the last normal menstrual period and early ultrasound information was not available [15].

3. Data Collection Tools and Techniques

This study used primary data which was collected from maternity wards, from Monday to Sunday, all postnatal mothers who had a live birth within 24 hours of delivery were identified from the delivery registry book in the labor ward which was the entry point during our study and then followed to their respective wards. Data was collected by using a face-to-face interviewer administered questionnaire. The language used in the questionnaires was Swahili, which is a local language and widely spoken by all Tanzanians. The questionnaire collected data on socio-demographic factors, previous pregnancy characteristics, antenatal characteristics, pregnancy complications (obstetrical factors), and maternal medical conditions among women who delivered a live baby at MNH. In addition, the clinical case record and the delivery book were studied to extract medical information that could not be obtained through an interview. Maternal background information, obstetrics history information, and history of previous preterm birth were all collected from the mother. Preterm prelabor rupture of membranes, pregnancy-related hypertension, antepartum hemorrhage, gestation diabetic mellitus, and history of burning sensation during pregnancy or treatment for urinary tract infections were among the details extracted from the patient medical records. Anemia was defined as a hemoglobin level of <11 g/dl as documented by the attending clinicians and midwives during admission or antenatal follow-up. Pregnancy related hypertension was defined as documented by the attending clinician as a blood pressure of > 140/90 mmHg after 20 weeks of pregnancy with or without proteinuria. Gestational diabetic mellitus was defined as increased blood sugar after 24 weeks of gestation as documented by the attending clinician. Any vaginal bleeding in the mother after 28 weeks of pregnancy was characterized as antepartum haemorrhage as documented in the records by the attending clinician, urinary tract infection was defined as a documented clinical/laboratory diagnosis at any time during the pregnancy and/or a positive history of UTI treatment as reported by the mother and documented by the attending clinicians.

4. Data Analysis

The information collected was organized, filtered, and double-checked for accuracy. Then were coded and entered into the computer and then were analyzed using SPSS software (Version 23; Chicago, IL, USA). Analysis was done by both descriptive and analytical statistics. Mean frequency and percentages were used in descriptive statistics. The chi-square (x2) test and fisher exact test of association were used to establish associations between preterm delivery and the various associated factors. Bivariable and multivariable logistic regression model analyses were carried out to establish the strength of associated between the independent factors and preterm delivery. In bivariate logistic regression analysis, variables with p-value less than or equal to 0.2 were entered to multivariate logistic regression analysis to find the strength of association. Finally, a statistically significant association of variables were claimed based on the Adjusted Odds Ratio (aOR) with its 95% CI and P-value <0.05.

5. Results

During the study period, 422 mothers were enrolled, interviewed, and analyzed. The results indicated that 84 (19.9%, 95% CI;16.8-22.6) mothers had a preterm delivery with a CI (16.8-22.6), out of which 56(13.3%) had a late preterm delivery (34-36 weeks of gestation) and 28 (6.6%) had early (28-33 weeks of gestation) preterm delivery.

Out of the total 422 mothers included in this study, the mean age of the study participants was 27.00 (+ 7) with an interquartile range of ± 7. 74.4% of the study participants were ranging between 20 and 34 years old, 87.4% were married, 49.8% were self-employed mothers. According to the respondents' maternal education status, 39.8% of the mothers had completed a college or university education. (Table 1).

Variables		Frequency n (%)
Maternal age (Years)		
	< 20	13(3.1)
	20 – 34	314(74.4)
	>35	95(22.5)
	Mean age(SD)	27(±7)
Marital status		
	Married	369(87.4)
	Single	52(12.3)
	Widower	19(0.3)
Education status		
	Informal education	7(1.7)
	Primary education	111(26.3)
	Secondary education	136(32.2)
	College education	168(39.8)

Occupation status		
	Employed	100(23.7)
	Self employed	210(49.8)
	Unemployed	112(26.5)
History of substance abuse		
	Taking alcohol during pregnancy	15(3.7)
	Not taking alcohol	407(96.3)

Table 1: Socio-Demographic Characteristics of the Study Participants (N=422)

Majority (71.1%) of mothers were para, 1 to 3. 72.7% of the mothers had a birth interval greater than or equal to 2 years. 97% of the mothers had singleton deliveries. 99.8% of mothers had at least one ANC visit, while 85.5 % of those who attended ANC follow-up had four or more visits. Concerning delivery mode, vaginal delivery accounted for 58.3% of all deliveries (Table 2).

Variable		Frequency n (%)
Parity of the mother		
	1	62(14.7)
	2- 3	300(71.1)
	≥ 4	60(14.2)
Previous preterm[b]		
	Yes	96(26.5)
	No	263(73.5)
Interpregnancy interval (months) [c]		
	< 24	53(14.5)
	≥ 24	307(85.5)
ANC visit		
	Yes	407(99.8)
	No	1(0.2)
Number of ANC visit		
	< 4	61(14.5)
	≥ 4	361(85.5)
HB (g/dL)		
	< 10	55(13.3)
	≥ 10	366(86.7)
Mode of delivery		
	Vaginally	246(58.3)
	Cesarean Section	176(41.7)
Obstetric complication		
	Maternal Hypertensive disorders	46(10.9)
	PPROM	30(7.1)
	Multiple pregnancy	22(5.2)
	Antepartum hemorrhage	13(3.1)
	Gestation diabetic	8(1.9)
	None	303(71.8)
Medical and gynecological conditions		
	Anemia in pregnancy	59(14.0)
	History of UTI	32(7.6)
	Diabetic mellitus	9(2.1)

	HIV	6(1.4)
	None	313(74.2)

Table 2: Clinical and Obstetric Characteristics of the Study Participants (N=422)

Key: b; n=359, c; n=347, Frequencys did not tally with total due to missing values of variables, UTI: urinary tract infection. PPROM: preterm prelabor rupture of membrane, HIV: Human Immunodefiency virus, ANC: Antenatal care, HB: Haemoglobin.

According to bivariate analysis, the proportion of preterm delivery was significantly higher in women who had history of preterm delivery, history of short interpregnancy interval, with less than 4 ANC follow-up, and low level of hemoglobin level during pregnancy. Concerning the obstetrical complications and maternal medical condition, mothers with maternal hypertensive disorders, Antepartum hemorrhage, PPROM, Multiple pregnancy, and Urinary tract infection were statistically significant associated with preterm-delivery (Table 3).

Variable		**Delivery status**		**P - value**
		Preterm n (%)	**Term n (%)**	
Parity of the mother				
	< 4	69 (19.1)	293 (80.9)	0.286
	≥ 4	15 (24.1)	45 (75.9)	
Previous history of pre-term*				
	Yes	42 (43.8)	54 (56.2)	< 0.001
	No	33 (8.8)	243 (91.2)	
Interpregnancy interval (months) *				
	< 24	19 (35.8)	34 (64.2)	0.002
	≥ 24	53 (17.3)	254 (82.7)	
No. of ANC contacts				
	<4	31(51.7)	29(48.3)	<0.001
	>4	52(14.4)	309(85.6)	
HB level				
	<11g/dl	23(41.8)	32(58.2)	<0.001
	≥11g/dl	60(19.6)	306(80.4)	
Maternal Hypertensive Disorders				
	YES	22(47.8)	24(52.2)	<0.001
	NO	62(16.5)	314(83.5)	
APH				
	YES	7(53.8)	6(46.2)	0.006
	NO	77(18.8)	332(81.2)	
PPROM				
	YES	13(43.3)	17(56.7)	0.002
	NO	71(18.1)	321(81.9)	
Multiple Pregnancy				
	YES	12(54.5)	10(45.5)	<0.001
	NO	72(18.0)	328(82.0)	
Gestation Diabetic Mellitus				
	YES	1(12.5)	7(87.5)	1.000
	NO	83(20.0)	331(80.0)	
Urinary tract infection				
	YES	13(40.6)	19(59.4)	0.004
	NO	71(18.2)		319(81.8)
Anemia in pregnancy				

	YES	26(44.1)		33(55.9)
	NO	58(16.0)		305(84.0)
Diabetic Mellitus				
	YES	1(11.1)	8(88.9)	0.695
	NO	83(20.1)	330(79.9)	
HIV				
	YES	1(16.7)	5(83.3)	1.000
	NO	83(20.0)	333(80.0)	
Cervical Insufficiency				
	YES	0(0.0)	5(83.3)	0.513
	NO	84(20.0)	333(80.0)	

Table 3: Obstetrical and Medical Maternal Factors Associated with Preterm Delivery (N=422)
Key: *; n=372, n=361, Frequencys does not tally with total due to missing values of variables, PIH: Pregnancy related hypertension, APH: antepartum hemorrhage, PPROM: preterm prelabor rupture of membrane, HIV: Human Immunodefiency virus.

According to the logistic regression model, mothers with history of preterm delivery were five times more likely to have preterm delivery compared to the contrary (aOR=5.36, 95%CI 2.53-11.33), mothers who had a short Interpregnancy intervals of less than 24 months were 3-times more likely to give preterm delivery compared to those with interval greater than or equal to 24months (aOR=2.95, 95%CI 3.08-9.06),mothers with ANC follow up of less than 4 visits were three times more likely to have preterm delivery compared to those who had more than four visits (aOR=2.99,95%CI 2.79-14.37), mothers with pregnancy related hypertension (PIH) were 11-times more likely to have preterm delivery compared to those with no PIH (aOR=10.75,95%CI 5.75-18.33),mothers who experienced antepartum hemorrhage (APH) were 14fold more likely to give a preterm delivery compared to women with no APH (aOR=14.46,95% CI 4.92–24.27) ,mothers who experienced PROM during pregnancy were 5fold to have preterm delivery compared to those who had not encountered PROM (aOR =5.95, 95% CI 1.94 – 14.12),mothers with multiple gestation were almost 10folds to give preterm delivery compared to mothers with single tone pregnancy (aOR = 10.65; 95% Cl; 4.41-17.98). Concerning the maternal medical conditions, the risk of preterm delivery increased in the 3-fold in mothers with a positive history of maternal urinary tract infection (UTI) compared to women with no history of UTI (aOR = 3.08; 95% Cl; 2.467, 12.412). (Table 4).

Variable	Categories	Univariate analysis		Multivariate analysis		P - value
		cOR	95% CI	aOR	95% CI	
Previous Preterm	YES	5.12	3.59-11.89	5.36	2.53-11.34	<0.001
	NO	Re				
Interpreg. Interval	<24	2.07	1.48-5.20	2.95	3.08-9.06	0.004
(months)	≥ 24	Re				
No. of ANC Visits	< 4	2.65	1.22-5.27	2.99	1.79-8.38	0.045
	≥ 4	Re				
HB Level(g/dl)	< 11	1.33	0.18-1.61	0.09	0.01-7.07	0.339
	≥ 11	Re				
PIH	YES	2.63	1.97-4.41	10.75	5.75-18.33	<0.001
	NO	Re				
APH	YES	2.97	1.91-5.61	14.45	4.92-24.27	<0.001
	NO	Re				
PPROM	YES	2.67	1.46-5.68	5.94	1.94-14.12	0.002
	NO	Re				
Multiple Pregn.	YES	2.62	1.37-5.58	10.65	4.41-17.99	<0.001
	NO	Re				

UTI	YES	1.12	1.34-6.78	3.07	1.94-8.15	0.036
	NO	Re				
Anemia	YES	1.61	0.35-2.54	0.54	0.13-6.12	0.428
	NO	Re				

Table 4: Univariate and Multivariate Analysis of the Factors Associated with Preterm Delivery.
Key: cOR: crude Odds Ratio, aOR: adjusted Odds Ratio, CI: confidence interval, Re: Reference group, PIH: Pregnancy related hypertension, APH: antepartum hemorrhage, PPROM: preterm pre-labor rupture of membrane, GDM: gestation diabetic mellitus, Pregn: pregnancy, UTI: urinary tract infection.

6. Discussion

Preterm delivery is one of the most concerning health problems and remains as a major problem for both obstetric and pediatric teams at Muhimbili National Hospital. This study found that the prevalence of preterm delivery at Muhimbili National Hospital was 19.9%. Previous preterm delivery, short interpregnancy interval, maternal ANC follow-up of <4 contacts, multiple gestation, pregnancy-related hypertensive disorders antepartum hemorrhage, prelabor rupture of membranes and maternal urinary tract infections were identified as independent factors relating to preterm delivery.

The study demonstrated a significant higher prevalence of preterm delivery. This finding is consistent with other studies reported in sub-Saharan countries which had similar outcomes [16, 17]. The high rate of preterm delivery in this study is also in consistent with World Health Organization (WHO) estimates in which the highest rate was 18% in sub Saharan Africa. The present study's preterm birth rate is substantially higher than that reported by Temu et al and Mahande et al in northern eastern Tanzania [18].The difference in preterm delivery rates can be explained by the different study approaches and study setting. The prevalence in this study is lower than the 25% reported in Ethiopia, these differences might be attributed to differences in the study regions, which could be influenced by differences in social economic position, health seeking behavior, and the enhancement of various health programs.

Most previous studies have shown that previous pregnancy history is the most important factor which contributes to the increased risk of recurrence of preterm delivery. This study found that the previous pregnancy history was associated with preterm delivery, women with a history of preterm delivery in the preceding pregnancy were significantly associated with preterm delivery. This finding was similar to the findings of other studies [19, 20].This may be explained by the presence of persistence unidentified factors in some women precipitating preterm delivery reference.

This study also found that mothers with a short interpregnancy pregnancy intervals of < 24 months were significantly associated with preterm delivery. These findings consisted with the findings of studies done in Ethiopia and that of Agustin Conde and his colleagues but contrary to the studies reported in Nigeria [21, 22]. The difference observed in the results may be explained by intensified nutritional care of mothers soon after delivery, which is commonly depending on local and community practice as a result of early recovery from previous delivery references.

The new ANC model for positive pregnancy experience recommends pregnant women to have a minimum of eight ANC contacts and Tanzanian has adopted this recommendation in its guidelines. This is a goal-centered approach model between the client and healthcare providers and has been shown to improve maternal and perinatal outcome. Pregnancy monitoring tends to be inadequate in sub-Saharan countries due to a lack of an effective perinatal health care system. This study found that the few number of ANC follow-up could have led to preterm delivery. These findings are similar to what was reported in previous studies done in Zimbabwe, Tanzania , Nigeria and Ghana [23- 25].

Urinary tract infection is the most common bacterial illness that occurs during pregnancy. Preterm birth was linked to mothers with a positive history of urinary tract infection in this study, which was comparable to findings reported in studies conducted in Iran, Ethiopia, Kenya, and Nigeria [26- 29]. This could be due to the fact that infection can cause the release of inflammatory chemokines, microbial endotoxins, and cytokines like interleukins and tumor necrosis factors, which stimulate the production of prostaglandins and matrix-degrading enzymes, which then stimulate uterine contractions, resulting in preterm birth [30].

The study found that anemia in pregnancy was not associated with an increased risk of preterm delivery similar to other studies reported in Kenya and Nigeria. However, the findings of this study were contrary to other studies reported in China, Malawi, and Ethiopia [31- 35]. This may be explained by the different in antenatal health related program approach, availability of iron and folate supplements, and local nutrition status as this may contribute to the reduction of complications caused by anemia including preterm delivery.

In this study, preterm delivery strongly correlated with obstetric complications of the index pregnancy. This study found that pregnancy related hypertensive disorder was significantly associated with an increased risk of preterm delivery, consistent with studies reported in Debramarkos town health institutions, Gond town health institutions, and other places in Ethiopia. This can be explained by the fact that pregnancy-related hypertension can influence placental vascular injury, which can then trigger a cascade of uterine contractions, resulting in premature birth.

Antepartum hemorrhage (APH) and pregnancy outcomes in various areas showed to be associated with a higher rates of preterm delivery. Like other reports in Cameroon, Ethiopia, and Tanzania, this study also found that APH was significantly associated with preterm delivery. This is mostly because APH frequently results in an early birth due to the risk it poses to both the expectant mother and the fetus.

This study found that mothers who had experienced preterm premature rupture of membranes were significantly associated with an increased risk of preterm delivery. This finding is similar to other studies conducted in Cameroon, Ethiopia, Ghana, Nigeria and in Kenya, [36]. This can be explained by the fact that premature membrane rupture increased fetal plasma interleukin-6, which can precipitate preterm labor and delivery.

In this study, multiple pregnancies were found to be a significant factor associated with increased risk of preterm delivery. Other reports in Northern Eastern Tanzania, Nigeria, Iran, Ethiopia, Kenya, Ghana, and the Democratic Republic of Congo reported similar outcomes [37].The possible reason may be because multiple pregnancy has been associated with other pregnancy-related complications which if not addressed end up with preterm delivery.

6.1. Limitations of the Study

The study was conducted based only on one institution source which could result in over or under reporting, which could not be generalized. Furthermore, only live birth mothers and their newborns were included in the study, which may have resulted in an underestimation of the proportion.

7. Conclusion

Preterm delivery is still a public health concern and a serious problem in both obstetric and pediatric care at tertiary hospitals in Tanzania which must be addressed to reduce perinatal mortality. History of preterm delivery, short interpregnancy interval, ANC visits of less than four, preterm PROM, pregnancy-related hypertensive disorders, multiple pregnancies, antepartum hemorrhage and urinary tract infection are independent factors associated with preterm delivery. To reduce the risk of preterm delivery, all at-risk pregnant women should receive more intensive prenatal care. Useful checklists and screening tool need to be improved which will help to identify all women with higher risk of developing preterm delivery.

Abbreviation

MNH: Muhimbili National Hospital; MUHAS: Muhimbili University of Health and Allied Science; KCMC: Kilimanjaro Christian Medical Centre; APH: Antepartum Hemorrhage; NC: Antenatal care; DM: Diabetic Mellitus; GDM: Gestation diabetic mellitus; Hb: Hemoglobin; HTN: Hypertension; HIV; Human immunodefiency virus; PIH: Pregnancy Induced Hypertension ; PPROM: Preterm pre labor rupture of membrane ; PTB: Preterm birth; PTD: Preterm delivery; SDGs :Sustainable Development Goals ; SPSS: Statistical Package for Social Sciences ; UTI: Urinary tract infection ; WHO: World Health Organization; CI: Confidence interval, COR: Crude odds ratio; AOR, Adjusted Odds ratio.

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Ethical Approval and Consent

Ethical clearance of the study was obtained from MUHAS Senate of Research Publication Committee. Permission to conduct the study was obtained from MNH Authoritys. Only women who gave informed consent were recruited to participate in the study.Mothers with preterm delivery during the study were given care and health education on the factors associated with preterm delivery and how to handle their preterm babies . All participants were fully informed about the research and their rights to participate or withdraw from the study. Privacy and confidentiality were assured to all study participants and the study findings will be widely disseminated to the stakeholders involved in this study.

Conflict of Interest.

We declare that there was no conflict of interest in this study.

References

1. Ndeki, P., August, F., Kikula, A., Alli, S., Somi, J., & Massawe, S. (2023). Prevalence of preterm delivery and associated factors among women who delivered a live baby at Muhimbili National Hospital, Dar es Salaam, Tanzania.
2. Chawanpaiboon, S., Vogel, J. P., Moller, A. B., Lumbiganon, P., Petzold, M., Hogan, D., ... & Gülmezoglu, A. M. (2019). Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. *The Lancet global health, 7*(1), e37-e46.
3. Walani, S. R. (2020). Global burden of preterm birth. *International Journal of Gynecology & Obstetrics, 150*(1), 31-33.
4. Parums, D. V. (2021). Revised World Health Organization (WHO) terminology for variants of concern and variants of interest of SARS-CoV-2. Medical Science Monitor:

International Medical Journal of Experimental and Clinical Research, 27, e933622-1.
5. Bekele, I., Demeke, T., & Dugna, K. (2017). Prevalence of preterm birth and its associated factors among mothers delivered in Jimma university specialized teaching and referral hospital, Jimma Zone, Oromia Regional State, South West Ethiopia. *J Women's Health Care, 6*(1), 1-10.
6. Dbstet, A. (1977). WHO: recommended definitions, terminology and format for statistical tables related to the perinatal period and use of a new certificate for cause of perinatal deaths. *Acta Obstet Gynecol Scand, 56*(3), 247-53.
7. Blencowe, H., Cousens, S., Oestergaard, M. Z., Chou, D., Moller, A. B., Narwal, R., ... & Lawn, J. E. (2012). National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. *The lancet, 379*(9832), 2162-2172.
8. Bérard, A., Le Tiec, M., & De Vera, M. A. (2012). Study of the costs and morbidities of late-preterm birth. *Archives of Disease in Childhood-Fetal and Neonatal Edition.*
9. Mahande, M. J., Daltveit, A. K., Obure, J., Mmbaga, B. T., Masenga, G., Manongi, R., & Lie, R. T. (2013). Recurrence of preterm birth and perinatal mortality in northern Tanzania: registry-based cohort study. *Tropical Medicine & International Health, 18*(8), 962-967.
10. Blencowe, H., Cousens, S., Chou, D., Oestergaard, M., Say, L., Moller, A. B., ... & Born Too Soon Preterm Birth Action Group (see acknowledgement for full list). (2013). Born too soon: the global epidemiology of 15 million preterm births. *Reproductive health, 10*, 1-14.
11. Muchie, K. F., Lakew, A. M., Teshome, D. F., Yenit, M. K., Sisay, M. M., Mekonnen, F. A., & Habitu, Y. A. (2020). Protocol: Prevalence and associated factors of preterm birth in Ethiopia: systematic review and meta-analysis protocol. *BMJ open, 10*(5).
12. Aregawi, G., Assefa, N., Mesfin, F., Tekulu, F., Adhena, T., Mulugeta, M., & Gebreayezgi, G. (2019). Preterm births and associated factors among mothers who gave birth in Axum and Adwa Town public hospitals, Northern Ethiopia, 2018. BMC research notes, 12, 1-6.
13. Moore, M. L. (2002). Research Update: Preterm Birth: A Continuing Challenge. *The Journal of perinatal education, 11*(4), 37-40.
14. Areas, A. (2012). POPULATION AND HOUSING CENSUS Population Distribution by. 2013.
15. Ballard, J. L., Khoury, J. C., Wedig, K. L., Wang, L., Eilers-Walsman, B. L., & Lipp, R. (1991). New Ballard Score, expanded to include extremely premature infants. *The Journal of pediatrics, 119*(3), 417-423.
16. Okube, O. T., & Sambu, L. M. (2017). Determinants of preterm birth at the postnatal ward of Kenyatta National Hospital, Nairobi, Kenya. *Open Journal of Obstetrics and Gynecology, 7*(09), 973.
17. Wagura, P., Wasunna, A., Laving, A., Wamalwa, D., & Ng'ang'a, P. (2018). Prevalence and factors associated with preterm birth at kenyatta national hospital. *BMC pregnancy and childbirth, 18*(1), 1-8.
18. Temu, T. B., Masenga, G., Obure, J., Mosha, D., & Mahande, M. J. (2016). Maternal and obstetric risk factors associated with preterm delivery at a referral hospital in northern-eastern Tanzania. Asian Pacific *Journal of Reproduction, 5*(5), 365-370.
19. Sifer, S., Kedir, B., Demisse, G., & Sisay, Y. (2019). Determinants of preterm birth in neonatal intensive care units at public hospitals in Sidama zone, South East Ethiopia; case control study. *J Pediatr Neonatal Care, 9*(6), 180-186.
20. Abaraya, M., Seid, S. S., & Ibro, S. A. (2018). Determinants of preterm birth at Jimma university medical center, Southwest Ethiopia. *Pediatric health, medicine and therapeutics,* 101-107.
21. Abiodun, O. O., & Francis, B. (2014). Factors associated with spontaneous preterm delivery in a Nigerian Teaching Hospital. *Bangladesh Journal of Obstetrics & Gynaecology, 29*(1), 9-14.
22. Etuk, S. J., Etuk, I. S., & Oyo-Ita, A. E. (2005). Factors influencing the incidence of pre-term birth in Calabar, Nigeria. *Nigerian Journal of Physiological Sciences, 20*(1), 63-68.
23. Temu, T. B., Masenga, G., Obure, J., Mosha, D., & Mahande, M. J. (2016). Maternal and obstetric risk factors associated with preterm delivery at a referral hospital in northern-eastern Tanzania. *Asian Pacific Journal of Reproduction, 5*(5), 365-370.
24. Aseidu, E. K., Bandoh, D. A., Ameme, D. K., Nortey, P., Akweongo, P., Sackey, S. O., ... & Kenu, E. (2019). Obstetric determinants of preterm delivery in a regional hospital, Accra, Ghana 2016. *BMC pregnancy and childbirth, 19,* 1-8.
25. Chiabi, A., Mah, E. M., Mvondo, N., Nguefack, S., Kamga, K. K., Mboudou, E., ... & Zhang, S. (2013). Risk factors for premature births: a cross-sectional analysis of hospital records in a Cameroonian health facility. *African journal of reproductive health, 17*(4), 77-83.
26. Taha, Z., Ali Hassan, A., Wikkeling-Scott, L., & Papandreou, D. (2020). Factors associated with preterm birth and low birth weight in Abu Dhabi, the United Arab Emirates. *International journal of environmental research and public health, 17*(4), 1382.
27. Deressa, A. T., Cherie, A., Belihu, T. M., & Tasisa, G. G. (2018). Factors associated with spontaneous preterm birth in Addis Ababa public hospitals, Ethiopia: cross sectional study. *BMC pregnancy and childbirth, 18,* 1-5.
28. Alijahan, R., Hazrati, S., Mirzarahimi, M., Pourfarzi, F., & Hadi, P. A. (2014). Prevalence and risk factors associated with preterm birth in Ardabil, Iran. *Iranian journal of reproductive medicine, 12*(1), 47.
29. Mokuolu, O. A., Suleiman, B. M., Adesiyun, O. O., Adeniyi, A. (2010).on om m er ci al us e on om m al e on.
30. Romero, R., Espinoza, J., Gonçalves, L. F., Kusanovic, J. P., Friel, L., & Hassan, S. (2007, January). The role of inflammation and infection in preterm birth. In *Seminars in reproductive medicine* (Vol. 25, No. 01, pp. 021-039). Copyright© 2007 by Thieme Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.
31. Abdo, R. A., Halil, H. M., Muhammed, M. A., & Karebo,

M. S. (2020). Magnitude of preterm birth and its associated factors: a cross-sectional study at butajira hospital, southern Nations, Nationalities, and people's region, Ethiopia. *International Journal of Pediatrics, 2020.*

32. van den Broek, N. R., Jean-Baptiste, R., & Neilson, J. P. (2014). Factors associated with preterm, early preterm and late preterm birth in Malawi. *PloS one, 9*(3), e90128.
33. Bekele, T., Amanon, A., & Gebreslasie, K. Z. (2015). Preterm birth and associated factors among mothers who gave birth in Debremarkos-town health institutions 2013 institutional basedcrosssectional study. *Gynecol Obstet (Sunnyvale), 5*(5), 1000292.
34. Zhang, Q., Ananth, C. V., Li, Z., & Smulian, J. C. (2009). Maternal anaemia and preterm birth: a prospective cohort study. *International journal of epidemiology, 38*(5), 1380-1389.
35. Huang, A., Jin, X., Liu, X., & Gao, S. (2015). A matched case–control study of preterm birth in one hospital in Beijing, China. *Reproductive health, 12*(1), 1-6.
36. Mbayo, F. I., Nsenga, Y. B., Lupitshi, G. K., Nyemba, K. T., Mpingisha, C. M., Kambala, J. B., & Muzinga, G. K. (2020). The determinants of premature birth during the year 2018 at the General Reference Hospital of Malemba in the Democratic Republic of Congo. *Pan African Medical Journal, 37*(1).
37. Ndeki, P., August, F., Kikula, A., Alli, S., Somi, J., & Massawe, S. (2023). Prevalence of preterm delivery and associated factors among women who delivered a live baby at Muhimbili National Hospital, Dar es Salaam, Tanzania.