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**Expected Adverse Pregnancy Outcome Among HIV-Positive Women on ART
before and during Pregnancy Delivered at Mwananyamala and Amana
Regional Referral Hospital, Dar es salaam Region Tanzania from December
2018 to July 2019**



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Expected Adverse Pregnancy Outcome Among HIV-Positive Women on ART before and during Pregnancy Delivered at Mwananyamala and Amana Regional Referral Hospital, Dar es salaam Region Tanzania from December 2018 to July 2019

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Abstract.

Purpose. The aim of the study was to determine any adverse pregnancy outcomes among HIV-positive pregnant women delivered at Mwananyamala and Amana regional referral Hospitals in Dar es Salaam Tanzania.

Methodology: Descriptive cross-sectional study was used and total of 322 participants were enrolled in this study. The study was conducted at Dar es Salaam Region Tanzania Amana and Mwananyamala hospital. Non-probability sampling (convenient sampling) in which all HIV positive pregnant women who were on ART before and during pregnancy was included in the study.

Findings: In this study prevalence of adverse pregnancy outcome among HIV pregnancy women on ART was found to be 19.5%; delivery by caesarian section, and 1.24%; by assisted delivery, while 27.02%; had preterm delivery which is higher compared to the study conducted in Tanzania Urban and Rural in 2014 where by the prevalence was 11%. This result was also contrary to the study conducted in Zanzibar prevalence was found to be lower by 3%.

Unique Contribution to Theory, Practice and Policy: This study has found that postnatal women who were started ART during pregnancy were at higher risk of getting newborn with adverse outcome compared to those who started ART before pregnancy.

Keywords: *Adverse Pregnancy Outcome, HIV positive, Pregnancy, Birth outcomes, ART use, Pregnant women.*

Introduction.

Adverse pregnancy outcome among HIV positive women who delivery, are those observations in the study which shown that HIV infections associated with varying rates of stillbirth, perinatal and infant mortality, intra-uterine fetal growth restriction and low birth weight. Human immunodeficiency virus infection and acquired immune deficiency syndrome is a disease spectrum of the human immune system caused by infection with human immunodeficiency virus (HIV).The term HIV/AIDS represents the entire range of the infection caused by the human immunodeficiency virus.(1,2)

The Prevention of Mother to Child Transmission of HIV (PMTCT) services have been implemented in the country since 2000. In 2012, Tanzania adopted the global plan for elimination of HIV infection among children born to HIV-infected mothers and keeping their mothers alive. The goal of the national elimination of Mother to Child Transmission (eMTCT) plan was to reduce vertical transmission rate from 26% in 2010 to 4% by the end of 2015. To further expedite progress towards the set target, Tanzania in 2013 adopted the WHO recommendation of providing Life Long ART to pregnant and Lactating women living with HIV (LLAPLa), using a fixed dose combination regimen (TLE) of one pill once per day (also known as Option B+). By December 2014, countrywide LLAPLa rollout was achieved. Hence it is envisaged that the programme will contribute towards achieving the goal by 2030. (3,4,5,6)

Mother-to-child transmission (MTCT) of HIV refers to the transmission of HIV infections from HIV-infected mothers to their infants. MTCT can occur during pregnancy, labour and delivery, and breast-feeding. Without intervention, the overall risk of MTCT is approximately 20% to 45%. Transmission of HIV from mother to her child accounts for over 90% of all HIV infections in children aged below 15 years. The UNAIDS and the international community have set a goal to eliminate new HIV infections by 2030. In order to achieve this goal, an ambitious target of 90% of all PLHIV were know their HIV status (diagnosed), 90% of those diagnosed to have HIV infection were on antiretroviral therapy (ART), and 90% of those on ART will be achieved sustainable viral suppression by 2020. The government has strengthened efforts to scale up HIV prevention, care, treatment, and support services including the recent adaption of the Treat All (test and treat) strategy.

HIV and AIDS-related deaths among youths and middle-aged adults has resulted in thousands of orphans. AIDS was widespread in both urban and rural communities and mostly affects persons at the peak of their sexual and productive lives. The death of a young adult often means loss of a family's primary income earner. The HIV and AIDS epidemic has caused breakdown of social networks in African societies. Stigma associated with HIV continues to prevail. Orphans were not only subjected to material, social, and emotional deprivation, but also lack of opportunity for education and health care. Widows and orphans were deprived of their inheritance rights.

Programmes to mitigate the impact of AIDS should include: strong and high-level political leadership, a national strategic plan and adequate funding for the HIV and AIDS response; strong and sustained community involvement and initiatives; and supportive policies.

The National response to HIV and AIDS includes interventions aimed at prevention, care, treatment, and support. The Government, in collaboration with development and implementing partners, initiated care and treatment programme under the NACP. The percentage of people living HIV/AIDS receiving antiretroviral treatment in Tanzania Mainland has increased from 52% in 2005 to 62% in 2016. (7,8,9,10). HIV infection is acquired through unprotected sexual intercourse with an infected partner; exposure to infected blood and blood products; or transmission from an infected mother to the unborn child in the uterus, during delivery or breast milk. More than 90% of adults in sub-Saharan Africa acquire HIV infection through unprotected sexual intercourse to an infected partner. Transmission of HIV through body fluids other than blood and genital secretions such as cerebrospinal fluid, pleural fluid and amniotic fluids were also possible. However, unless blood was visibly present, saliva, sputum, sweat, tears, feces, nasal secretions, urine, and vomits carry a very low risk of transmission of HIV. The late symptoms of the infection were referred to as HIV/AIDS. (11,12)

Problem statement.

HIV/AIDS infection is an important cause of maternal and perinatal morbidity/mortality in sub Saharan Africa. Anaemia, pre-term labour, intrauterine growth restriction (IUGR), fetal deaths, still births, abortion and LBW are some of the adverse outcomes associated with HIV in pregnancy (13, 14). HIV in pregnancy is a problem that needs special consideration as far as fetal and maternal wellbeing was concerned. It is a major medical problem encountered especially in developing countries including Tanzania and is associated with high morbidities and mortality. It is associated with detrimental fetal outcome especially when the patient has advanced stage of the diseases. (19, 20). In Tanzania it was estimated that about 58% of the infected adults were women of the child-bearing age. The distribution of HIV/AIDS according to age and sex shows that the most affected age-group was 15-49 years. Young women between the ages of 15-24 were more infected and more at risk mostly because of their child bearing role. (21, 22).

Literature review.

HIV/AIDS is a major public health concern and cause of death in many parts of Africa, although the continents have about 15.2 percent of the world's population. Sub-Saharan Africa alone accounted for an estimated 70 percent of all people living with HIV and 70 percent of all AIDS deaths in 2011.(7) Countries in North Africa and the Horn of Africa have significantly lower prevalence rates, as their populations typically engage in fewer high-risk cultural patterns that have been implicated in the virus's spread in Sub-Saharan Africa, Southern Africa was the most affected region on the continent. As of 2011, HIV has infected at least 10 percent of the population in

Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe.(3,24–26)

A recent study of HIV-infected pregnant women in Cameroon (2017) enrolled in a perinatal clinical trial found that risk factors for adverse pregnancy outcomes (preterm birth, low birth weight, and intrauterine growth restriction) in antiretroviral-treated women were similar to those reported for uninfected women. (27)

Virtually all countries in WHO African Region have generalized HIV/AIDS epidemics with at least 1% of pregnant women attending antenatal clinics in the urban areas are HIV infected. At regional level, the most consistent and significant HIV prevalence declines were observed among pregnant women in Dar es Salaam (from 12.8% to 6.08%). Dodoma (6.1% to 1.96), Mbeya (16.0% to 11.31%), Kigoma (from 5.1% to 1.31%), Tanga (from 9.2% to 4.76%), and Arusha (from 6.1% to 2.84%) $p < 0.001$. Furthermore, substantial HIV prevalence declines were observed among ANC attendees in Kilimanjaro, Morogoro, Mara, Tabora and Iringa regions. Notably, Kagera and Mtwara regions which have participated in five ANC shown insignificant changes in HIV prevalence trends ($p = 0.2$). (13).

HIV/AIDS especially when advanced may result in an increase in pregnancy complications, e.g. Intrauterine Growth Restriction (IUGR) or Intrauterine fetus death (IUFD). Low birth weight, prematurity which usually was a sequel of preterm rupture of membranes.(16–19,28,29). A study in India (2017) detected a higher risk of low birth weight or immaturity among babies of HIV-infected women, especially those who were symptomatic. In this cohort, with regular antenatal care and multidisciplinary approach there was a similar obstetric and perinatal outcome in HIV-infected and uninfected women. The only significant finding was that the mean birth weight was lower in newborns of HIV-infected women. (30) in a larger cohort study done in South Africa (2010) of 1449 untreated HIV-infected women, adverse pregnancy outcome associated were low birth weight (LBW), abortions and stillbirths. (31).

Study done in India (2010), Lionel J et al reported the obstetric outcome in 109 HIV-infected women, these women were significant more likely to have PIH, anemia, and stillbirths. They did not comment on preterm births. Fetal deaths were more likely in women who did not receive MTCT prophylaxis. (32). In a meta-analysis, which included 44 studies, Calvert C et al found that HIV-infected women have three times higher incidence endometritis (14). Parsaei et al from London and Patil S et al from India reported similar antenatal and postnatal complications in HIV-infected women who received ART compared to the uninfected antenatal population.(33,34)

Complications of early pregnancy have been associated with HIV infection in several studies. HIV-1 and HIV-2 infection in Africa have both been linked to a higher rate of spontaneous abortion (35). A Zambian study (2012) of 1229 HIV-infected found the ratio of miscarriage and stillbirth per 100 live-births were 3.1 and 2.6, respectively.(36).

A Nigerian cohort study (2012) assessed the pregnancy, obstetrics and neonatal outcomes among HIV positive pregnant women. One thousand one hundred and fifty adverse events (48.3%) were recorded in the HIV positive women on ART during pregnancy compared to seven hundred and twenty two (30.3%) events recorded in the HIV positive women on ART before pregnancy. The difference was statistically significant at $P < 0.001$ (OR: 2.08; CI: 1.84-2.34). While the rates of spontaneous miscarriage ($p=0.002$), severe anaemia ($P=0.03$), preterm delivery ($P<0.001$), low birth weight ($P<0.001$) and perinatal death ($P<0.001$) were found to be significantly higher in HIV positive women compared to their HIV negative counterparts.(20)

The World Health Organization (WHO) recommends triple antiretroviral therapy for all pregnant women with CD4 cells less than 350/mL or who are at clinical stage 3–4 of disease. For those with less advanced disease, two options are recommended. Option A includes short course of Zidovudine during pregnancy and extended infant nevirapine (NVP) prophylaxis. Option B includes maternal 3-drug ART during pregnancy and breastfeeding, with cessation after weaning. Selected PMTCT programs in sub-Saharan Africa are implementing Option B, and “Option B+” which includes a lifelong ART for all pregnant, HIV-infected women, regardless of CD4 cell count or disease stage. ART given to HIV infected pregnant women diminishes the rate of MTCT; this is true for mono-, bi-, or tri-therapy (HAART), with the greatest effects seen in the latter case it will be critical to carefully monitor pregnancy outcomes to assess risks and benefits of the different regimens (21, 22, 23, 24).

By the end of 2015, the number of health facilities registered to deliver HIV care and treatment services was over 30008. The country was implementing initiatives to increase HIV testing services through expansion of provider initiated testing and counseling (PITC) and community-based testing and counseling (CBTC). By June 2016, it was estimated that 839,544 (63%) of an estimated (1.34 million) adults and children living with HIV were receiving antiretroviral drugs (ARVs).(4)

Provision of long-life ART to pregnant and lactating mothers as part of prevention of mother-to-child transmission (PMTCT) programmes has contributed to the decrease of the transmission of HIV infections from mother to child from 8.7% in 2012 to 4.4% in 2015. Reproductive and child health (RCH) sites providing PMTCT services increased from 5,361 to 5,863 (i.e. about 91% of all RCH facilities) by 2014 and the percentage of pregnant and lactating women receiving ARVs increased from 71% in 2012 to 90% in 2014.(9,10). In Tanzania HIV infection is caused by HIV-1 subtype. The common HIV-1 sub-types (clades) in Tanzania were A, C, D, and their recombinants. There was no HIV-2 subtype infection reported to date.

A study done in Tanzania, undertaken in nine selected regions Arusha, Kilimanjaro, Tanga, Dodoma, Kagera, Mwanza, Kigoma, Mtwara and Iringa, shows HIV/AIDS is now a major common medical problem encountered in reproductive health in Tanzania and this is challenged in the management of pregnancy outcome. [10]. A study done in Nigeria (2012) confirm the

adverse events in HIV positive of 48.3% was significantly higher in HIV pregnancy women on ART during pregnancy than 30.3% in the HIV positive women on ART before pregnancy ($P < 0.001$). (20).

There have been global efforts to minimize vertical transmission, by encouraging expectant mothers to test for HIV. Strategies to prevent mother-to-child HIV transmission included elective caesarean section delivery and antiretroviral treatment. Many studies performed in Africa have presented pregnancy outcomes among women with known HIV status, but few have included women with unknown HIV status. It was evident that not all pregnant women presenting for delivery at health facilities in developing countries, especially those in the sub-Saharan Africa, are aware of their HIV status. In Tanzania, which was among the ten countries with the highest estimated number of HIV-infected pregnant women, only 16% reportedly had an HIV test taken. Fetal loss, prematurity and low birth weight is also associated with maternal HIV status.(13).

Globally, an estimated 35.3 million people were living with HIV in 2012, over 90% of infections in children result from mother-to-child transmission (MTCT), and over 1,600 children are infected through MTCT each day. In parts of Southern Africa, the prevalence of HIV in pregnant women is over 30%. Women in developing countries where fertility rates are between 5-7 children per woman may experience particular spousal and familial pressure to become pregnant, even if they have disclosed their HIV status. The risk of MTCT of HIV is still high in developing countries where there are still deficient standards of healthcare, poor antenatal care, late diagnosis, lack of ART, and poor or haphazard interventions for Prevention of Mother to Child Transmission (PMTCT) of HIV.[14,15, 16)

Despite the fact that many individual and contextual risk factors to adverse birth outcomes have been identified, ART related causes of adverse birth outcomes are substantially unknown; there are even fewer acknowledged explanations for preterm births. Among the already identified risk factors, some still show mixed evidence, such as the association between preterm births and maternal HIV viral load. It has become very important to evaluate the effects of HAART on both pregnant mothers and their babies. The purpose of this was to compare perinatal outcomes among HIV infected pregnant women who were on, ART before and during pregnancy

Study area.

The study was conducted in Dar es Salaam Region. Which covers 1,365 square kilometers and a projected population of 4,364,541. The region is divided into districts namely Kinondoni, Ilala, Temeke, Kigamboni and Ubungo.

This study was conducted at two hospitals, Mwananyamala and Amana Regional Referral Hospital in Kinondoni municipality and Amana Regional Referral Hospital in Ilala Municipality both of which are in Dar es Salaam Region.

Kinondoni Municipality.

The Kinondoni Municipality is bordered by the Indian Ocean to the North East, Ilala District to the South and Ubungo District to the North. The Municipality is well linked by roads and other communication activities to the rest of the city and other parts of the country. Major roads are: Morogoro road, Bagamoyo road, Kawawa, Road Ally Hassan Mwinyi Road and Mwai Kibaki Road. The municipal has a total of 321 square kilometres. According to the 2012 population census. The Municipal had a population of 929681, whereby 431,653 were male and 478,028 were female. But with population projection to be 1134211 in 2016 where male 551019 and 583,192 female with a growth rate of 5% per annum. The municipal is estimated to have 283,532 households with an average of 4 persons per household. Kinondoni Municipal is responsible for providing health services to its people collaborating with private sector service providers. It currently has a total of 126 health facilities which 27 are government owned and the remaining are owned by private.

Ilala municipality.

The Municipality has a total area of 260.40 square kilometers. According to the 2012 population Census, the Municipality had a population of 845,368 where male was 409,149 and female was 436,219 but with the population projection of 2016 Ilala Municipal has a total population of 1,031,349 where by male are 499,161 and female are 532,188 with a growth rate of 5.0% per annum with a population density of 4,911 people per square kilometer. The municipal is estimated to have 257,837 households with an average of 4 persons per household. Ilala district council is responsible for providing health services to its people in collaboration with private sector service providers. The Council currently has a total of 68 health facilities of which 17 are government owned, and the remaining 51 are owned by Private Organizations. Amana hospital is the only hospital owned by the government providing health services within the Municipal. This hospital is called Amana Regional Referral Hospital which is providing services for 1,000 to 1,500 in and out patients per day. All the health facilities provide cure, preventions of communicable and non-communicable Diseases.

Study design.

A Descriptive cross-sectional study was used. In which the prevalence and pregnancy outcome Among HIV Positive women delivered at Mwananyamala and Amana Hospitals was done between December 2018 to July, 2019.

Target population.

All HIV positive women who on ART before and during pregnancy delivered at Mwananyamala and Amana regional referral hospitals in Dar es Salaam.

Study population.

All HIV positive pregnant women who on ART before and during pregnancy.

Incaution and exclusion criteria.

Inclusion included all HIV positive pregnant women on ART before and during pregnancy and exclude those who was HIV positive women on ART but refused to participants in the study.

The minimum sample required for the study was calculated using cochrans sample size the formula based on prevalence Rate taken from previous study (48.3%)⁽³⁷⁾

$$N = \frac{Z^2 P (1-P)}{\varepsilon^2}$$

Where; N = estimated minimum sample size

Z= 1.96 approximated (at 95% confidence interval)

P= Prevalence of adverse pregnancy outcome among HIV-positive women (48.3%)

ε= was the accepted margin of error (in this study taken to be 5%)

Prevalence in this study was

$$N = \frac{1.96^2 \times 0.483(1 - 0.483)}{0.05^2}$$

Based on this formula minimum sample size was 384

Selection of study participant.

Study participants were selected based on non-probability sampling (convenient sampling) in which all HIV positive pregnant women who were on ART before and during pregnancy who come to delivery at Mwananyamala and Amana Hospitals were recruited in the study. Therefore, selection of study participants in Mwananyamala and Amana Hospitals were calculated as follows:

Since delivery per day at Mwananyamala was 35-40 and Amana was 45-50 (ratio of 4:5) and sample size was 384, a total of 171 women were enrolled from Mwananyamala and 213 were enrolled from Amana hospitals.

Dependent variables were Low birth weight, pre maturity, miscarriage, premature ruptured of membrane, IUFD and IUFG and Independent variable was Pregnant women who were HIV Positive and on ART during pregnancy and before pregnancy.

Data was collected by using special structured questionnaire.

Data entry and analysis.

The collected data were checked for quality, Coding was done before entering the data into the computer statistical program. Analysis was done by principal using SPSS Version 23. Comparisons of variables was done using chi-squared test for categorical variables and student test for continuous variables. Two sided p-value of less than 0.005 were considered as representing statistically significant differences between variables.

Ethical clearance.

The approval to conduct the research was obtained from the Hubert Kairuki Memorial University research committee. Also, permission was given by respective Municipality Directors Kinondoni for Mwananyamala and Amana Regional Referral Hospitals. Research participants signed a written consent for their acceptance to participate in the study. Confidentiality was assured and maintained to research participants. The information obtained from research participants was used for research purpose, and was not be disclosed otherwise. During data collection participants were given numbers no one was identified by name. The participants refusal to signed the informed consent automatically was supposed to excluded, but there was no refusal in this study.

RESULTS

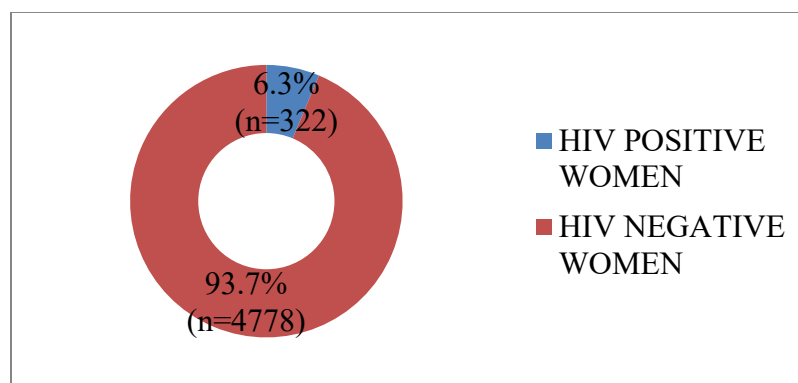


Figure 1: Prevalence of HIV among pregnant women who delivered at Amana and Mwananyamala Regional Referral Hospitals during the study period

Among the 5100 women who delivered during the study period, 6.3% (n=322) were HIV positive, while 93.7% (n=4778) were HIV negative. Among 384 studded, 322 (83.64%) were HIV Positive. 56(17.34%) started ART before pregnancy and 266(82.61%) started ART during pregnancy.

Table 1: Socio demographic characteristics of study participants

Characteristic	ART initiation before pregnancy n(%)	ART initiation during pregnancy n(%)	Total
Age distribution			
15-19	1(1.79)	23(8.61)	24(7.45)
20-24	14(25.00)	49(18.35)	63(19.57)
25-29	16(28.57)	86(32.21)	101(31.37)
30-34	17(30.36)	54(20.22)	71(22.05)
35-39	2(3.57)	40(14.98)	42(13.04)
40-44	6(10.71)	12(4.49)	18(5.59)
45-49	0(0.00)	3(1.12)	3(0.93)
Occupation			
Employed	11(19.64)	62(23.22)	73(22.67)
Not Employed	37(66.07)	148(55.43)	184(57.14)
Peasant	8(14.29)	57(21.35)	65(20.19)
Marital Status			
Single	23(41.07)	105(39.33)	128(39.75)
Married	33(58.93)	138(51.69)	170(52.80)
Separated/Divorced	0(0.00)	14(5.24)	14(4.35)
Widowed	0(0.00)	10(3.75)	10(3.11)
Level of Education			
No Formal Education	2(3.57)	18(6.74)	20(6.21)
Primary Education	25(44.64)	113(42.32)	137(42.55)
Secondary Education	25(44.64)	105(39.33)	130(40.37)
Tertiary Education	4(7.14)	31(11.61)	35(10.87)

Most of the HIV positive women on ART were aged between 25 to 29 years (31.37, n=101); not employed (57.14%, n=184), married (52.80%, n=170) and had primary level education (42.55%, n=137). The details were shown above table.

Table 2: Prevalence of adverse maternal outcomes among HIV positive women on ART

Maternal outcome	Frequency(n)	Percent(%)
Mode of delivery		
Normal delivery	255	79.19
Caesarean delivery	63	19.57
Assisted delivery	4	1.24
Gestation age at delivery		
Preterm (28-36 weeks)	87	27.02
Term (37-42 weeks)	235	72.98

In this study prevalence was 19.57% (n=63) and 1.24%(n=4) delivered by caesarean section and assisted delivery, respectively. Meanwhile 27.02%(n=87) had preterm deliveries. The details as shown above table.

Table 3: Prevalence of adverse fetal outcomes among HIV positive women on ART

Foetal outcome	Frequency(n)	Percent(%)
Birth weight		
Normal birth weight (>2500g)	128	39.75
Low birth weight (<2500g)	194	60.25
5-minute APGAR score		
8-10	79	24.53%
5-7	225	69.88%
<5	18	5.59%
Stillbirth		
No	304	94.41%
Yes	18	5.59%

In this study shows that 60.25%(n=194) delivered low birth weight babies, 5.59%(n=18) delivered babies with low APGRA score, and 5.59%(n=18) had stillbirth. Details as shown above table.

Table 4: Effect of socio demographic factors on gestational age at delivery among HIV positive women on ART

Variable	Preterm delivery n(%)	Term delivery n(%)	Odds Ratio	95% Confidence Interval	p-value
Age					
Below 35 years	78(30.12)	181(69.88)	2.59	1.22-5.50	0.011
Above 35 years	9(14.29)	54(85.71)			
Marital status					
Married	38(25.00)	114(75.00)	0.82	0.50-1.35	0.440
Not married	49(28.82)	121(71.18)			
Occupation					
Employed	10(13.70)	63(86.30)	0.35	0.17-0.73	0.003
Unemployed/peasant	77(30.92)	172(69.08)			
Level of Education					
Primary education or no formal education	52(33.12)	105(66.88)	1.84	1.12-3.03	0.016
Secondary education or higher	35(21.21)	130(78.79)			

Maternal age below 35 years shown by p = 0.011), primary level education/no education p = 0.016); being employed carried a less likelihood of preterm delivery p = 0.003).

However marital status did not have a statistically significant association with preterm delivery. Details as shown above table.

Table 5: Effect of socio demographic factors among HIV positive women on ART

Variable	Cesarean delivery n(%)	Vaginal/assisted delivery n(%)	Odds Ratio	95% CI	p-value
Age					
Below 35 years	48(18.53)	211(81.47)	0.73	0.38-1.41	0.344
Above 35 years	15(23.81)	48(76.19)			
Marital status					
Married	30(17.65)	140(82.35)	0.77	0.45-1.34	0.359
Not married	33(21.71)	119(78.29)			
Occupation					
Employed	14(19.18)	59(80.82)	0.97	0.50-1.88	0.924
Unemployed/peasant	49(19.68)	200(80.32)			
Level of Education					
Primary education or no formal education	38(24.20)	119(75.80)	1.79	1.02-3.13	0.040
Secondary education or higher	25(15.15)	140(84.85)			

In this study shows that women either no formal education or education up to primary level were more likely to deliver by caesarean section, compared to their counterparts who had higher level of education $p = 0.040$). Those who were aged below 35 years, married or employed were less likely to deliver by caesarean section. But these associations were not statistically significant.

Details as shown above table.

Table 6: Effect of socio demographic factors on birth weight among HIV positive women on ART

Variable	Low birth weight n(%)	Normal n(%)	B	Odds Ratio	95% C.I	p-value
Age						
Below 35 years	162(62.55)	97(37.45)	1.62	0.93-2.81	0.087	
Above 35 years	32(50.79)	31(49.21)				
Marital status						
Married	99(58.24)	71(41.76)	0.84	0.53-1.31	0.435	
Not married	95(62.50)	57(37.50)				
Occupation						
Employed	38(52.05)	35(47.95)	0.65	0.38-1.10	0.104	
Unemployed/peasant	156(62.65)	93(37.35)				
Level of Education						
Primary education or no formal education	105(66.88)	52(33.12)	1.72	1.10-2.71	0.018	
Secondary education or higher	89(53.94)	76(46.06)				

Only level of education (no education or primary education) had a significant association with low birth weight among HIV positive women by $p = 0.018$). But age, marital status and occupation did not have a statistically significant association with low birth weight. Details as shown above table.

Table 7: Effect of socio demographic factors on stillbirth among HIV positive women on ART

Variable	Stillbirth n(%)	Live birth n(%)	Odds Ratio	95% CI	p-value
Age					
Below 35 years	16(6.18)	243(93.82)	2.00	0.45-8.97	0.352
Above 35 years	2(3.17)	61(96.83)			
Marital status					
Married	13(7.65)	157(92.35)	2.43	0.85-6.99	0.089
Not married	5(3.29)	147(96.71)			
Occupation					
Employed	3(4.11)	70(95.89)	0.67	0.19-2.38	0.531
Unemployed/peasant	15(6.02)	234(93.98)			
Level of Education					
Primary education or no formal education	10(6.37)	147(93.63)	1.34	0.51-3.47	0.553
Secondary education or higher	8(4.85)	157(95.15)			

Aged below 35 years in this study shows by $p = 0.352$), and had no primary education by $p = 0.553$) were more likely to have stillbirths. Employed women were less likely to have stillbirths ($p = 0.531$). However, none of the socio demographic factors had a statistically significant association with stillbirth. Details as shown above table.

Table 8: Effect of socio demographic factors on 5- minute APGAR score (adverse fetal outcome) at delivery among HIV positive women on ART

Variable	Low Apgar score n(%)	Normal Apgar n(%)	Odds Ratio	95% CI	p-value
Age					
Below 35 years	16(6.18)	243(93.82)	2.00	0.45-8.97	0.352
Above 35 years	2(3.17)	61(96.83)			
Marital status					
Married	13(7.65)	157(92.35)	2.43	0.85-6.99	0.089
Not married	5(3.29)	147(96.71)			
Occupation					
Employed	3(4.11)	70(95.89)	0.67	0.19-2.38	0.531
Unemployed/peasant	15(6.02)	234(93.98)			
Level of Education					
Primary education or no formal education	10(6.37)	147(93.63)	1.34	0.51-3.47	0.553
Secondary education or higher	8(4.85)	157(95.15)			

In this study women aged below 35 years shows $p = 0.352$), married $p = 0.089$), and had no/primary education $p = 0.553$) were more likely to deliver babies with low APGAR score. But employed women were less likely to deliver babies with low APGAR score $p = 0.531$). However, none of the socio demographic factors had a statistically significant association with low APGAR score. Details as shown above table.

Table 9: Pregnancy outcome among women initiating ART before and during pregnancy

Pregnancy outcome	ART initiation during pregnancy	ART initiation before pregnancy	Odds Ratio	95% Confidence Interval	p-value
Gestation age at delivery					
Preterm	75(86.21)	12(13.79)	1.44	0.72-2.88	0.299
Term	191(81.28)	44(18.72)			
Mode of delivery					
Cesarean delivery	56(88.89)	7(11.11)	1.87	0.80-4.35	0.143
Normal/Assisted delivery	210(81.08)	49(18.92)			
5-minute APGAR score					
Low	17(94.44)	1(5.56)	3.76	0.49-28.82	0.173
Normal	249(81.91)	55(18.09)			
Birth Weight					
Low birth weight	166(85.57)	28(14.43)	1.66	0.93-2.96	0.085
Normal birth weight	100(78.13)	28(21.88)			
Stillbirth					
Yes	17(94.44)	1(5.56)	3.76	0.49-28.82	0.173
No	249(81.91)	55(18.09)			

In this study shows that preterm delivery was more likely among HIV-positive women who initiated ART during pregnancy than those who initiated before pregnancy ($p = 0.299$), as was caesarean section ($p = 0.143$), low APGAR score ($P = 0.173$) low birth weight ($p = 0.085$) and still birth ($p = 0.173$). However, none of these associations were statistically significant. Details as shown above table.

Discussion.

This was descriptive cross section study. Carried out in two hospitals Mwananyamala and Amana in Dar es Salaam. On adverse pregnancy outcomes among HIV positive women on ART before and during pregnancy delivered at Mwananyamala and Amana Regional Referral Hospitals.

In this study prevalence of maternal outcome among HIV pregnancy women on ART was found to be 19.5%; delivery by caesarian section, and 1.24%; by assisted delivery, while 27.02%; had preterm delivery which is higher compared to the study conducted in Tanzania Urban and Rural in 2014 where by the prevalence was 11%. This result was also contrary to the study conducted in Zanzibar prevalence was found to be lower by 3% (11,12).

Another significant finding was that, the age group which was more affected in my study is between 25 to 29 years age group. This is a similar study done in Tanzania (2012) whereby the most affected age group was 15 to 24 years. This could be attributed by the fact that is the most active age group. (13). The pregnancy outcome among HIV positive women initiating ART before pregnancy compared to those who initiated during pregnancy.

In this study shows that, preterm delivery was more likely among HIV positive women who initiated ART delivering pregnancy than those who initiated before. By $p = 0.290$, caesarean section $p = 0.173$, low birth weight 0.085, and still birth $p = 0.173$, however none of these association were statistically significant.

This result are similar to cohort study done in Nigeria (2017) which shows that the neonatal adverse outcome among HIV positive women who on ART during pregnancy was found to be 48.3% compared to those who on ART before by 30.3% (20). This differences were statistically significant at $p = 0.001$ (OR 2.08; CI: 1.84-2.34). While the rates of spontaneous miscarriage ($p = 0.002$), severe anaemia ($p = 0.03$), preterm delivery ($p = 0.001$), low birth weight ($p = 0.001$) and perinatal death ($p = 0.001$) were found to be significantly higher in HIV positive women on ART during pregnancy compared to on ART before. In this study prevalence of adverse fetal outcome among HIV positive women on ART found to be, 60.25%. Delivery low birth weight babies, 5.59% delivery babies with low APGAR score, and 5.59% delivery still birth.

This shows contrary results to the study done in Ethiopia (2012) found that prevalence of low birth weight was 21.4%, and preterm delivery was 16.6%, among new born with HIV positive women (13 to 14).

Conclusion.

This study was about to determine adverse pregnancy outcomes among HIV-positive pregnant women during and after delivery. Delivered at hospitals in Dar es Salaam who were started ART during pregnancy are at higher risk of getting newborn with adverse fetal outcome compared to those who started ART before pregnancy. Maternal care for HIV positive women should be strengthening and maintained in all HIV positive pregnancy women on adherence on ART before pregnancy so that to improve care.

Recommendation.

All women who are on reproductive age group should have blood test for HIV infection before pregnancy. And if they found to be HIV positive should advised on attending reproductive and child health clinic for pre pregnancy counselling where by they should plan in their pregnancy, so that they should start ART before pregnancy rather than to start ART during pregnancy. In order to reduce newborn with adverse fetal outcome.

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