

# HIV and Seroconversion among Pregnant Women at the University Hospital of Mother and Child in Chad

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## Abstract

**Background:** HIV in pregnant women presented a risk of transmission to newborns. This study was to determine HIV prevalence among pregnant women in the birthing rooms and give antiretrovirals to women infected and their newborns. **Methods:** A preliminary study was conducted from 2013 to 2015 at the Mother and Child Hospital. Pregnant women were counseled and tested for HIV-antibody according to the national algorithm using Determine HIV 1 & 2 and Immunocomb II Bispot HIV1 & 2. The women screened HIV-negative during the prenatal consultation and who accepted a second test were screened in the birth room. The data collected were processed using the Access Microsoft office 16 and SPSS software version 18. **Results:** A total of 6080 pregnant women were tested before and in the birth room. Of these, 5943 (97.4%) were detected as HIV-negative and 159 (2.6%) were HIV-positive. Of the 5943 with HIV-negative status, 1333 accepted the second test in the birth room, 10 of which have become HIV-positive. The rate of seroconversions was 0.75%. **Conclusion:** This study determined the prevalence of HIV in pregnant women. The result reveals the importance and necessity of repeating the screening test in the birth room because of the possibility of seroconversion or new infection during pregnancy.

## Keywords

HIV, Prevalence, Seroconversion, Pregnancy, Chad

## 1. Introduction

Mother-to-infant transmission of the Human Immunodeficiency Virus (HIV) is a public health problem in most countries, particularly in Sub-Saharan Africa [1] [2]. The prevalence of this infection varies from one continent to another and from one region to another within the same country. Children born of women with HIV can contract the virus during the period of pregnancy or during de birth [3]. According to the authors, without intervention, the probability of mother-to-infant transmission of HIV varies from 10% to 60% and depending on the circulating viral load [4]. Children infected usually die before their second birthday. The effective prevention of HIV transmission from mother to child is the treatment ARVs to pregnant women which could significantly reduce mother-to-child HIV transmission rates by up to 2% [5] [6] [7] [8]. Also, early initiation of Highly Active Antiretroviral Treatment (HAART) in children reduces the morbidity and mortality associated with HIV [9] [10]. World Health Organization reports that HIV prevalence is high in Sub-Saharan Africa [11]. Only, 45% of HIV-positive pregnant women receive ARVs for the prevention of HIV transmission VIH [11]. In Chad, AIDS sector program data report a national rate of 70.3% of women on antiretroviral therapy. In exposed children, only 17.3% have access to pediatric HIV care. The rate of early detection in children is estimated at 0.8%. Since 2013, the strategy of Prevention of Mother-To-Child Transmission (PMTCT) of HIV has been based on option B plus for children. This strategy consists of screening 90% of pregnant women and systematically putting 90% of HIV-positive women on Antiretrovirals (ARVs) to eliminate HIV transmission. The National Health Program recommends screening all pregnant women during prenatal consultation sessions. But, many women do not succeed in that recommendation. Many pregnant women often came under room birth without knowing their HIV serology. For this reason, this preliminary study was undertaken to screen pregnant women received for delivery who are unaware of their HIV status and routinely treated the women with HIV-positive. Also to give ARV syrup to newborns exposed to HIV the birth.

## 2. Methodology

### 2.1. Framework of the Study, and Period

This is a transversal study referred to descriptive and analytical of pregnant women during the period from 2013 to 2015 at the Mother and Child Hospital (MCH) in N'Djamena, Chad. The MCH is a public reference hospital. It has a department of Gynecology-Obstetrics, Pediatrics, Neonatology, Surgery, Medical Imaging, Biology Lab, and Morgue. This hospital is the only reference for the management of women's and children's health problems. It offers refocused prenatal consultation services, follow-up of HIV-infected pregnant women, screening of children at risk, and their follow-up. The variables considered in this study were age, HIV status, screening periods, marital status, education level, and the

number of pregnancies.

### 2.2. Inclusion and Non-Inclusion Criteria

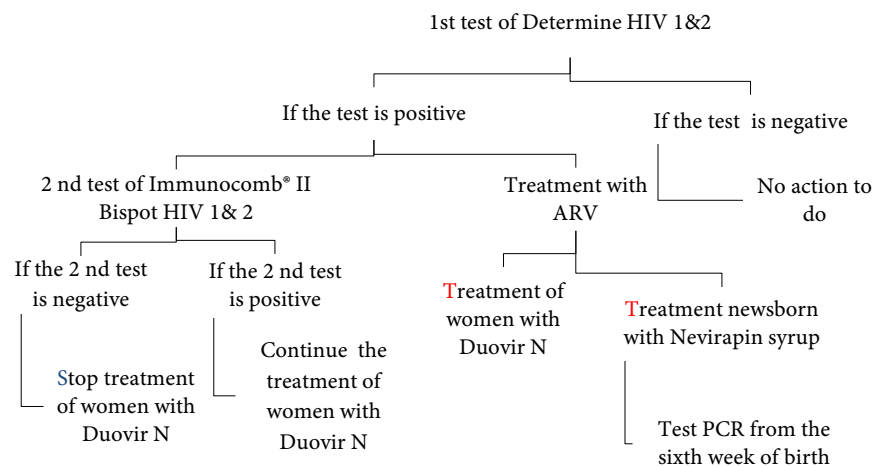
The population studies consisted of pregnant women who only followed for prenatal consultations or not and who arrived at the hospital for delivery. In the delivery room at the hospital, only women or companions who agreed to sign the individual consent to participate in the study were included. Pregnant women who did not sign informed consent were excluded from the study. The data collected was anonymous and the confidentiality of the information was preserved.

### 2.3. Samples Collection and Processing

Serology tests were done during the pregnancy from prenatal consultations and others also in the birth room. Determine combo HIV-1 and HIV-2 screening kit was used as the first test according to the algorithm of Chad. This is an immunochromatography (rapid) method for the quantitative detection of antibodies of all isotopes (IgG, IgM, IgA) specific to HIV-1 and HIV-2 simultaneously in serum. Positive cases were confirmed by a second test using ImmunoComb® II HIV 1 & 2 Bispot (Orgenics Ltd., YAVNE, Israel). Also, in the birth room, the whole blood of the woman was collected on an EDTA tube by venipuncture and tested. All women who tested positive for antibodies HIV received treatment Antiretrovirals (ARVs) and their newborns as presented in **Figure 1**. Children born to HIV-infected mothers were recalled from the sixth week of birth and tested by PCR (Abbott, USA) and treated.

### 2.4. Ethical Considerations

The study received authorization from the Ministry of Public Health of Chad. In addition to authorizations, individual consent signed by pregnant women was obtained for the collection of samples for research.



**Figure 1.** Algorithm of HIV test and ARV treatment in the room birth.

## 2.5. Statistical Analysis

Data collected were entered into Microsoft Office Access version 10, cleaned, validated during the workshop, and analyzed using IBM SPSS statistical software (IBM SPSS, Chicago, IL, USA), version 20. An analysis was conducted to assess the different variables to be associated with the risk of HIV among pregnant women. Then, a bivariate analysis by the cross table was done to search for associations between these variables. The level of significance of our findings was set at 95% with an error margin of 5% (0.05).

## 3. Results

### 3.1. Profile of Pregnant Women Surveyed

A total of 6080 pregnant women were concerned in this study. **Table 1** presents the detailed distribution of pregnant women surveyed by age. Female frequencies ranged from 14 to 19 years ( $n = 1486$ ), 20 to 24 years ( $n = 1724$ ), 25 to 29 years ( $n = 1379$ ), 30 to 34 years ( $n = 950$ ), 35 to 39 years ( $n = 418$ ), 40 years and older ( $n = 123$ ). Women under the age of 19 were the most observed compared to most other age groups. This result shows a high rate of girls who started high-rate sexual activities and married between 14 to 19 years (24.4%). The maximum rate has been observed in women aged 20 to 24 years.

### 3.2. Prevalence and Determinants of HIV among Pregnant Women

According to the elderly, the data showed that HIV-1 was all different ages of pregnant women (**Figure 2**). This rate was low among young women under 19 years of age (1.21%), but higher among women aged 30 to 34 years with a significant difference ( $p = 0.003$ ). However, the global prevalence found was 2.58%.

### 3.3. Distribution of HIV Infections by Educational Level

Concerning the educational level, our study showed that women illiterate had a higher infection rate (2.92%) than women who have a primary level (2.17%), secondary level (2.32%), and university level (2.17%) but this different are no significant ( $p = 0.693$ ). **Figure 3** shows the different percentages.

### 3.4. Distribution of Infection by Period, Number of Pregnancies, and Marital Status

According to the number of pregnancies, our study found a high rate of infection in women from the 3rd and 4th pregnancies with a rate of 2.76%, but no significant statistical analysis ( $p = 0.37$ ). On the other hand, for marital status, widowed ( $p = 0.000$ ) and divorced ( $p = 0.000$ ) women were the most infected compared to married women.

### 3.5. The New HIV Infection during Pregnancy or Seroconversion

Of the 2567 women who tested seronegative before pregnancy and during NPC,

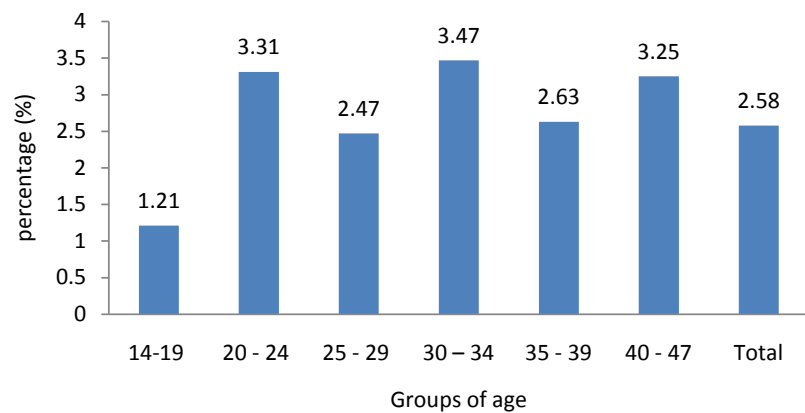
1333 accepted a second birth-room test, of which 10 women who were seronegative became positive, with 0.75% who can be a new infection (**Table 2**).

**Table 1.** Rate of new infection or seroconversion.

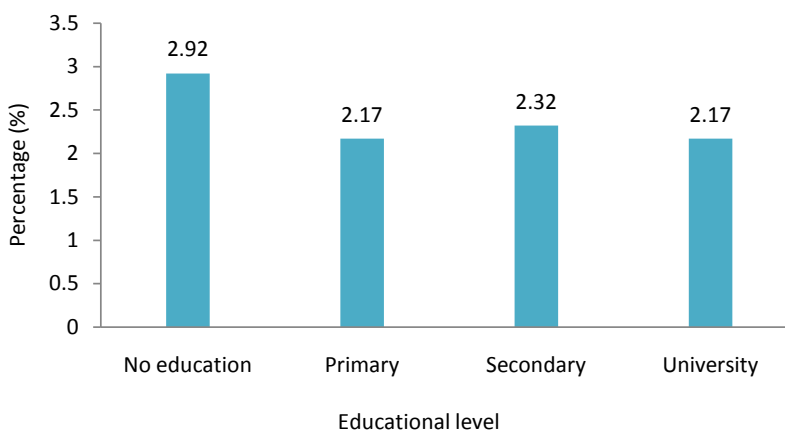
Variables	Total	HIV Positive		HIV Negative	
		n	%	n	%
<b>Screening Period</b>					
Before Pregnancy	1270	46	3.62	1224	96.4
During the Pregnancy	1406	63	4.48	1343	95.5
In the Birth Room	3404	48	1.41	3356	98.6
Total	6080	157	2.58	5923	97.42
<b>Number of Pregnancies</b>					
1 to 2 Pregnancies	1733	37	2.14	1696	97.86
3 to 4 Pregnancies	4345	120	2.76	4225	97.24
5 to 6 Pregnancies	2	0	0.00	2	100.00
Total	6080	157	2.58	5923	97.42
<b>Marital Status</b>					
Single	208	6	2.88	202	97.12
Divorced	23	3	13.04	20	86.96
Married	5846	147	2.51	5699	97.49
Widow	3	1	33.33	2	66.67
<b>Total</b>	<b>6080</b>	<b>157</b>	<b>2.58</b>	<b>5923</b>	<b>97.42</b>

**Table 2.** Rate of new infection or seroconversion.

HIV Test	Number	Rate (%)
HIV-Negative Tested from 1st test in the Birth Room	1333	100
HIV-Against Negative from 2nd Test in the Birth Room	1233	99.25
HIV-became Positive from 2nd Test in the Birth Room	10	0.75



**Figure 2.** HIV prevalence by groups of age among women.



**Figure 3.** Prevalence of HIV-1 by educational level.

#### 4. Discussion

This study revealed enough considerable prevalence of antibody-HIV among pregnant women and new infections during pregnancy in N'Djamena. However, it was found that there was more love than reported in the demographic survey in Chad [12]. It was also lower in some African countries including, 28.6% in Ibadan and 11.0% in Port Harcourt in Nigeria [13], 13.1% in maternity at the Central Hospital of Yaoundé in Cameroon [14], 6.6% in Ethiopia [15], 5.49% in Democratic Republic of Congo [16], 6% in Benin, 5% in Mauritania [17]. Out of Africa, a very low prevalence was reported in different regions of India as 0.44% in Maharashtra [18], 0.39% in Gujurat [19], and 1.03% in Punjab [20].

Our study showed that HIV most pregnant women infected were aged between 30 to 34 years, compared with other age groups ( $p = 0.003$ ). This conforms to the findings of the survey demographic in Chad [12]. These results were also similar to studies in Burkina Faso [21], Cameroon [22], and India [23].

It was observed a higher prevalence of HIV among women without a level of study or illiterate than those with a university level. This was closely followed by the less educated (primary). This result could justify the fact that women with high educational attainment have easy access to information on radio television and other sources of communication about HIV. In the field of health in general, scholarly education is a factor in decoding communication messages for behavioral change or social mobilization and marketing for disease control. A current study found rates to be lower in Cameroon, with a lower rate among pregnant women in out-of-school and higher rates among women at the primary level [22]. This finding agrees with a study in Port Harcourt in Nigeria which reported a significant difference between educational status and HIV seropositivity [17] [24]. However, this contradicts findings from a current study in India in which only 25% of seropositive women were illiterate and 75% were at the secondary level, and up [25].

Our study also revealed that pregnant women who have already had their husbands' death were the most infected with HIV. This shows that HIV/AIDS

affects many more married couples and could be the cause of death in married couples. This finding could be explained by practices about marriage and others such as infidelity, polygamy, divorce, and the inheritance of the spouse or wife of his dead or living brother. This finding confirms the data of the demographic survey in Chad [12] which reported a high rate among women who divorced or widows, but less among single and married. Other studies in Nigeria reported a statistically significant rate among formally married women [26] [27]. A similar study in Zimbabwean found that the relationship between HIV infection and marital status is more complex. HIV infection and marital status were statistically significant when sexual behavior is considered in the statistical model.

For the period of the test realized, our study showed that there was no significant difference between the infection rate of women tested before and those tested during prenatal consultations. However, it is important to offer the test to women who come for delivery. This could detect HIV-positive pregnant women in delivery rooms (1.41%) and give them ARVs for prophylaxis and reduce the risk of transmitting the virus to the newborn.

The study showed that for women who tested HIV before pregnancy and pregnant women tested during prenatal consultation all seronegative, some of them were in the seroconversion phase without the appearance of antibodies Anti HIV1 circulating in the blood. The retest of the approach to delivery is important and can detect the infected news. Virus seroconversion among pregnant women in this study is lower but very important to know for treatment. Many studies reported similar findings but were very high. It was 6.09% in Zambia [28], 2.6% in Kenya [29], 5.3% in Tanzania [30], and 17.7% in Zimbabwe [31]. Data reported that HIV is a public health problem among pregnant women in both countries, but the seroconversion rate varies from country to country reflecting different interventional policies to combat HIV infection in these different countries.

Our study had a reasonable sample. The limitation of this study is that it was conducted among pregnant women in the mother and child hospital of N'Djamena only. It is a preliminary study of screening HIV in pregnant women in room birth. Data found were from the capital city and can be not generalized as a general in Chad. Moreover, the viral load testing of pregnant women was not evaluated and all new birth of positive women was not tested by PCR for HIV detection to 6 weeks.

## 5. Conclusion

In this study, we report for the first time based to know HIV prevalence in pregnant women screened during prenatal consultations and birth-room work. The findings revealed that HIV infections have been various by age and are higher among young women from thirty. This calls for urgent and concerted efforts aimed at promoting a strategy of preventing HIV transmission from her to new birth and social changes that will reverse the current trend in the prevalence

of HIV. This result demonstrates the importance and the need to repeat the screening test in the birth room given the possibility of seroconversion during pregnancy.

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### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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