

Full Length Research Paper

## Assessing the relevance of extending the prevention of mother to child human immunodeficiency virus (HIV) transmission procedure to women with unproductive pregnancies

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In Cameroon, with regards to the national reprisal to human immunodeficiency virus/acquired immune deficiency syndromes (HIV/AIDS), the HIV status of a mother delivering a live baby, when declared unknown is always determined in the delivery room. This protocol is not applicable to women, whose pregnancies have been identified as unproductive. A descriptive study was conducted in three public hospitals in Yaounde from January, 2009 to February, 2012. It aimed at contributing to the reduction of maternal and foetal mortality. A total of 14174 pregnant women were part of this study. The prevalence rates of unproductive pregnancies were 14.9, 14.5 and 15.4% in 2009, 2010 and 2011, respectively. Stillbirths were the most common type and elective abortions the least frequent. HIV prevalence rates were 10.7% for women who delivered live babies and 10.5% for those who had unproductive pregnancies. HIV was not an influential factor on the outcome of pregnancy, neither on the type of unproductive pregnancy. Among the women with unproductive pregnancies and HIV positive status, 52.4% were unaware of their HIV status. They could have returned home in complete ignorance of their HIV status despite their passage through a hospital. Therefore, it may be important to extend prevention of mother-to-child HIV transmission (PMTCT) to such cases.

**Key words:** Unproductive pregnancies, pregnancy adverse outcomes, human immunodeficiency virus (HIV), pregnancy.

### INTRODUCTION

Pregnancy is the set of phenomena that occur in women between fertilization and birth (Fleischman et al., 2010). Generally, it is productive, that is to say, it leads to the birth of a live child. Pregnancy can sometimes be unproductive. Indeed, it may be voluntarily or involuntarily terminated before full-term or upon reaching full-term, resulting in stillbirth (NIS, 2004). There are four types of

unproductive pregnancies namely, ectopic pregnancies, spontaneous abortions, elective abortions and stillbirths (*in utero* death and fetal death during childbirth). In general, there are various causes of unproductive pregnancies. By and large genetic (Hasegawa et al., 1996), uterine (Baba et al., 2011), endocrine (Bussen et al., 1999) or funicular (Winbo et al., 1998) abnormalities,

infectious diseases (Simpson et al., 1996), exogenous factors, chronic diseases or obstetric problems (Winbo et al., 1998) cause unproductive pregnancies. In Cameroon, 25% of women of childbearing age have had at least one unproductive pregnancy (National Institute of Statistics, 2004).

Women are more vulnerable to HIV infection than men. If the prevalence of HIV in Cameroon in 2012 was estimated at 4.3% for the general population, it was twice as high for women of childbearing age than men in the same age bracket (National Institute of Statistics, 2012). Concerning the prevention of mother-to-child HIV transmission (PMTCT), when declared unknown, the HIV status of the mother giving birth to a live child is always determined in the delivery room. This protocol is not applicable to women with pregnancies identified as unproductive.

Generally, considering the high vulnerability of women to HIV infection, and that many of these women who have unproductive pregnancies end up returning to their homes without knowing their HIV status, despite been in a hospital, it was necessary to conduct a study to assess the relevance of extending the PMTCT procedure to such cases. Hence, the prevalence of unproductive pregnancies in three public hospitals in Yaounde was determined and the HIV prevalence among such women was evaluated and compared to that of women who gave birth to a live child. The relationship between HIV and the outcome of a pregnancy was then examined. Lastly, the impact of various factors, such as HIV, on the type of unproductive pregnancy was also evaluated.

## METHODOLOGY

This study was carried out in two parts. The first part was a retrospective study which determined the prevalence of unproductive pregnancies in the Yaounde Central Hospital (HCY) from 2009 to 2011 and the second part was a prospective component consisting in calculating the percentage of unproductive pregnancies recorded from September 2011 to February 2012 in three hospitals in Yaounde, namely, the Yaounde Central Hospital (HCY), the Obstetrics, Gynecology and Pediatrics Hospital (HGOPY) and the Efoulan District Hospital (HDE). This second part also involved the search for anti-HIV1 and 2 antibodies in women with productive pregnancies PP (+) or unproductive pregnancies PP (-) who were hospitalized in the three hospitals. Patients' socio-demographic and clinical data (age, marital status, education, occupation, number of pregnancies, number of unproductive pregnancies, and history of sexually transmitted infections (STIs) other than HIV) were collected. Clearances were obtained from the National Ethics Committee and administrative authorities. Participants were recruited among women hospitalized in the antenatal clinic in these hospitals after receiving adequate information about the study and giving their consent. Screenings were performed according to the national algorithm for HIV care (pre-test counselling, announcement of results, post-test counselling).

### Determination of the prevalence of unproductive pregnancies

It was conducted using the information collected from the maternity records on the number of pregnant women and the number of

women with unproductive pregnancies PP (-).

### Search for antibodies to HIV 1 and 2

After collecting blood samples at the elbow, the search for anti-HIV 1 and 2 was carried out using two immuno-chromatographic tests (Determine HIV 1 and 2 and HIV KHB 1 and 2).

### Statistical analysis of data

Statistical analyses were conducted using the STATA 12.1 software (STATA Corporation, college Station, TX, USA). The  $\chi^2$  test and when sample sizes were too small, Fisher's exact test were used to compare the distribution of the categorical variables between the groups of unproductive pregnancy. For continuous variables, comparisons were based on the non-parametric Mann-Whitney two sample-sample tests. The significance level was set at 0.05 in all cases. The impact of various variables on the type of unproductive pregnancy was studied using "multinomial logit regression". These variables included: HIV status, knowledge of HIV status, age ( $\geq 30$  versus  $< 30$ ), marital status, level of education and history of STIs other than HIV.

## RESULTS

In HCY, 4115, 3893 and 4164, pregnant women were admitted consulted in 2009, 2010 and 2011, respectively of which 615, 565 and 641 were PP (-). So, the prevalence rates of unproductive pregnancies were 14.9, 14.5 and 15.4% in 2009, 2010 and 2011, respectively.

In 2012, 2002 pregnant women were admitted in the three hospitals selected for the study, and 302 were PP (-), giving a 15.1% prevalence rate of unproductive pregnancies. All the PP (+) women and 200 (66.2%) PP (-) women consented to participate in this study. Table 1 illustrates the characteristics of the PP (-) women according to the type of unproductive pregnancy. Out of the 200 PP (-) women, 33.5% had experienced stillbirths (SB), 27.5% had had spontaneous abortions (SA), 25.5% ectopic pregnancies (EP) and 13.5% induced or elective abortions (EA). 182 (10.7%) PP (+) women and 21 (10.5%) PP (-) women turned out to be carriers of antibodies to HIV 1 or 2. Among the latter, 10 (47.6%) declared they had known their HIV status whereas 11 (52.4%) said they were unaware of it.

### Impact of various factors on the type of unproductive pregnancy

#### HIV

"The results obtained from the multivariate multinomial logit model show that the risk of HIV infection was similar among the four groups of PP (-) women, adjusted on age, educational level and marital status. However, HIV infection seemed more frequent among women who had a stillbirth (16.4%) and least among those who had opted

**Table 1.** Characteristics of the women with unproductive pregnancies according to the type of unproductive pregnancy.

Characteristic	Ectopic pregnancies N=51	Elective abortion N=27	Spontaneous abortion N=55	Stillbirths N=67	P value
<b>HIV status</b>					
Positive	5 (9.8%)	1 (3.7%)	4 (7.3%)	11(16.4%)	0.272
<b>Aware of HIV status</b>					
Yes	36 (70.6%)	25 (92.6%)	30 (54.6%)	23 (34.3%)	<0.001
<b>Age</b>					
Median [IQR]	29 [24 - 32]	25 [20 - 29]	27 [23 - 34]	27 [23 - 31]	0.02
≥ 30	23 (45.1%)	4 (14.8%)	18 (32.7%)	25 (37.3%)	0.054
<b>Marital status</b>					
Single	28 (54.9%)	22 (81.5%)	25 (45.5%)	33 (49.3%)	0.02
Partner	10 (19.6%)	1 (3.7%)	5 (9.1%)	8 (11.9%)	
Married	13 (25.5%)	4 (14.8%)	25 (45.5%)	26 (38.8%)	
<b>Education</b>					
Primary	11 (21.6%)	6 (22.2%)	9 (16.4%)	23 (34.3%)	0.33
Secondary	35 (68.63%)	17 (63%)	38 (69.1%)	39 (58.2%)	
Higher	5 (9.8%)	4 (14.8%)	8 (14.6%)	5 (7.5%)	
<b>History of STIs other than HIV</b>					
Positive	16 (31.4%)	2 (7.4%)	9 (3.6%)	18 (26.9%)	<0.001
Negative	27 (52.9%)	20 (74.1%)	34 (61.8%)	34 (50.7%)	
<b>Occupation</b>					
Housewives	13 (25.4%)	10(37%)	19 (34.5%)	34 (50.7%)	<0.001
Pupils/students	6 (11.8%)	10 (37%)	10 (18.2%)	8 (11.9%)	
Others	32 (62.7%)	7 (25.9)	26 (47.3%)	25 (37.3%)	

for an elective abortion (3.7%). These differences were not significant ( $p=0.27$ ). Moreover, the proportion of women unaware of their HIV status was statistically different ( $p>0.001$ ) between the four groups of PP (-) women. Hence, women who had stillbirth comprised the majority (65.7%) unaware of their HIV status, whereas those who had elective abortion were in minority (7.4%).

### Age

The median age of PP (-) women was 27 years (interquartile range [IQR] 23 to 31). It was higher in women with ectopic pregnancy, while it was lower among those who had abortion, these differences were statistically significant ( $p=0.02$ ). Thus, PP (-) women below 30 years were four times (relative risk ratio (RRR), 4.21,  $p=0.023$ ) more likely to make an elective abortion than an ectopic pregnancy.

### History of STIs others than HIV

Out of the PP (-) women, 45 (22.5%) reported having had an STI other than HIV, 115 (57.5%) had stated the opposite and 40 (20%) did not know whether they had had an STI or not. Elective abortions were the least common type of unproductive pregnancies for all the women. Stillbirths and ectopic pregnancies were higher in women with a history of STIs than in the others. Among those without a history of STIs, spontaneous abortions and stillbirths were the most common. Their percentages were similar (29.57%). These interactions between history of STIs other than HIV and unproductive pregnancies were statistically significant ( $p<0.001$ ).

### Marital status

As regards marital status, 108 PP (-) women (54%) were

single whereas 92 (46%) were in a relationship. Elective abortions were four times more frequent (20.37%) among single women than among those in a relationship (5.43%). Married PP (-) women were about three times (RRR, 2.73,  $p=0.03$ ) more likely than singles to make a spontaneous abortion than an ectopic pregnancy.

### **Education**

Concerning their level of education, 49 (24.5%) PP (-) women attended primary education while 151 (75.5%) attended secondary education and above. Spontaneous abortions were more common among those with a secondary level of education (30.46%) than among those with primary education (18.37%). Stillbirths were more frequent (46.94%) among those of the primary level than among their secondary level counterparts (29.14%). These interactions were not statistically significant ( $p>0.05$ ) (Figure 5).

### **Occupation**

Concerning occupation, 90 women (45%) were employed, 76 (38%) were housewives and 34 (17%) were pupils/students. Elective abortions were more common among pupils/students than in the other categories. Stillbirths were about twice more common among housewives than in the other two categories. Ectopic pregnancies were twice more common among employed women than among the others. These interactions were statistically significant ( $p<0.001$ ).

## **DISCUSSION**

From 2009 to 2011, the prevalence of unproductive pregnancies were constant in HCY with an average of 14.9%. The values were lower than the 25% measured by the National Institute of Statistics in 2004. This difference could have been generated by the fact that our study was conducted in three hospitals in the country's capital city, that is to say, in a population supposed to have easy access to health care and, in addition, the participants were recruited in hospitals while the National Institute of Statistics study was a national survey that was conducted within populations outside hospitals, both in urban and rural areas. This difference could also be a reflection of the improvement of the mother and child health situation in the country.

Most women with unproductive pregnancies who were recruited for the prospective study did not know if they had contracted diseases such as malaria, toxoplasmosis, listeriosis, brucellosis, or rubella during pregnancy. These results indicate that prenatal testing is not yet mandatory in our country and that despite the progress made, much

remains to be done in terms of protecting maternal-fetal health.

Stillbirths were the most common unproductive type of pregnancy (33%) and elective abortions the least (13.5%). Spontaneous abortions (27.5%) and ectopic pregnancies (25.5%) were in between the two aforementioned. Pursuant to Cameroonian legislation, elective abortions are prohibited. Hence, their occurrence, as the least common type of unproductive pregnancy, may be considered as an illustration of the repressive effect of the law. This result does not testify to the full acceptance of the concerned law by women. It also casts doubts on the true etiology of the so-called spontaneous abortion.

Antibodies against HIV were present in 10.7% of the PP (+) women and in 10.5% of PP (-). These values are approximately 2.4 times higher than the national prevalence (4.3%) published in 2012 by the National Institute of Statistics. This difference could be explained by the fact that our study population was sexually active while the National Institute of Statistics worked in all population groups. These results seem to exclude the possibility of the involvement of HIV in the etiology of unproductive pregnancy. In De Cock et al. (1994) had demonstrated the opposite in Côte d'Ivoire. Their results may have been influenced by the high prevalence of HIV and the prevailing disorganization in the control of the pandemic in the 90s. Nowadays, the control is well organized in most countries and the prevalence has steadily declined. In Cameroon, in order to prevent mother-to-child transmission of HIV, the HIV status of a mother delivering a live baby, when declared unknown is always determined in the delivery room. This provision does not apply to women with unproductive pregnancies. The results of our study show that 52.4% of women with unproductive pregnancies and HIV positive would have been sent home in complete ignorance of their HIV status despite their passage through a hospital.

The HIV status and level of education showed no statistically significant interactions with the type of unproductive pregnancy, unlike age, marital status, occupation, and history of STIs. However, HIV prevalence was higher in the group of women who had a stillbirth (16.4%) than in those who delivered babies (10.7%) or those who voluntarily aborted (3.7%). Nurudeen et al. (2013) described the desire of many HIV seropositive women to have children. Median age was higher in women with ectopic pregnancy, while it was lower among those who had abortion. This result could indicate the probable involvement of physiological factors in the genesis of this type of UP. The frequency of induced abortions decreased with age. This PP (-) was more common among students than among housewives and employed women. This confirms the higher exposure of the still financially dependent younger girls to unwanted pregnancies, and also their boldness since elective abortion is prohibited. These PP(-)s were also four times more common among unmarried women than those in a relationship while

spontaneous abortions occurred conversely. These results fall in line with those obtained by Osborn et al. (2000). They indicate the exposure of single women to unwanted pregnancies and the involvement of physiological factors in the genesis of spontaneous abortions.

Stillbirths and ectopic pregnancies which were more frequent in women with a history of STIs could be due to the weakening of the reproductive system as a result of the STIs. The frequency of stillbirths was higher among housewives (44.74%) than employed women (27.78%), while ectopic pregnancies were more frequent among employed women than among housewives. It is supposed that housewives are more involved in physical hard work while employed women are more submitted to psychological stress.

### Conclusion

Unproductive pregnancies are a serious problem in Cameroon as seen from the high prevalence rate. Stillbirths were the most common type of PP (-) and elective abortions the least frequent. HIV was not an influential factor on the fate of a pregnancy, neither on the type of unproductive pregnancy. However, the percentage of women with HIV infection was higher in the group of women who had stillbirths. A total of 52.4% of HIV positive women with unproductive pregnancies were unaware of their HIV status and may have returned home in complete ignorance despite their passage through a hospital. Therefore, it may be important to extend PMTCT to women who undergo an unproductive pregnancy.

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