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Risk Factors of HIV Infection in Pregnant Women at the Maternity of the Yaoundé Central Hospital

Facteurs de risque d'infection par le VIH chez les femmes enceintes de l'unité de maternité de l'Hôpital Central de Yaoundé

Jeanne Hortence Fouedjio[1,2], Florent Ymele Fouelifack[1,3,4], Loic Dongmo Fouelifa[5], Robinson Mbu[1,2]

[1] Obstetrics and Gynecology Unit of the Yaounde Central Hospital - Cameroon.
[2] Department of Obstetrics and Gynecology, Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I - Cameroon.
[3] Department of Obstetrics and Gynecology of the Higher Institute of Medical Technology in Yaoundé Cameroon.
[4] Research, Education and Health Associative Group GARES-Falaise, Dschang-Cameroon. PO Box: 31186 Yaounde- Cameroon Tel: +237 696 312 354 Email: yfouelifack@yahoo.fr
[5] Faculty of Health Sciences, University of Lomé, Togo, School of Armies Health Services of Lomé, P.O.Box:14148 Lomé, Togo. Email: dongmoloic@gmail.com
Corresponding author: Jeanne Hortence FOUEDJIO PO Box: 31186 Yaoundé - Cameroon
Tel: +237 696 81 83 39.
Email: fouedjiojeanne@yahoo.fr

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ABSTRACT

Introduction and objectives. HIV infection affects millions of people worldwide, especially in sub-Saharan Africa. Transmission occurs by several means including the transmission from mother to child. The main objective of this study was to determine the risk factors of HIV infection among pregnant at the maternity unit of Yaoundé Central Hospital. **Methods.** We conducted an analytical cross-sectional study at the Obstetrics and Gynecologic Unit of the Yaoundé Central Hospital from 6th October 2015 to 30th June 2016. The sampling was consecutive. Testing was done by a sensitive test and a specific test if the first was positive. Data analysis was done through Excel 2007 software EpiData Analysis Version 3.2 and STATA version 12.0 (Texas USA 2001). Statistical significance was accepted for a value of P <0.05. **Results.** We included 360 pregnant women. Their average age was 27.99 +/- 5.63 years, ranging from 15 and 47 years. HIV prevalence was 13.1% (47/360). The main risk factors of HIV infection were the primary level of education (OR = 7.97; 95% CI = 2.23 to 28.49, P = 0.001) and multiple sexual partners (OR = 4.82; CI 95% = 2.24 to 10.38, P = 0.002). **Conclusion.** The low level of education and multiple sexual partners are significantly associated with HIV infection. We recommend the education of the girls which is a key factor for the empowerment of women.

RÉSUMÉ

Introduction. L'infection par le VIH affecte des millions de personnes en Afrique subsaharienne. Les modes de transmission sont multiples parmi lesquels la transmission de la mère à l'enfant. L'objectif principal de cette étude était de déterminer les facteurs de risque d'infection par le VIH chez les femmes enceintes de l'unité de maternité de l'Hôpital Central de Yaoundé. **Méthodologie.** Nous avons mené une étude analytique transversale à l'Unité de gynécologique et obstétrique de l'hôpital central de Yaoundé du 6 octobre 2015 au 30 juin 2016. L'échantillonnage était consécutif. Les tests du VIH ont été effectués par un test sensible et un test spécifique si le premier était positif. L'analyse des données a été réalisée à l'aide du logiciel EpiData Analysis Version 3.2 et STATA version 12.0 (Texas USA 2001). La signification statistique a été acceptée pour une valeur de P <0,05. **Résultats.** Nous avons inclus 360 femmes enceintes. Leur âge moyen était de 27,99 +/- 5,63 ans, avec des extrêmes allant de 15 à 47 ans. La prévalence du VIH dans cette population était de 13,1% (47/360). Les principaux facteurs de risque d'infection par le VIH ont été le niveau d'éducation primaire (OR = 7,97; IC à 95% = 2,23 à 28,49 ; P = 0,001) et plusieurs partenaires sexuels (OR = 4,82; IC 95% = 2,24 à 10,38 ; P = 0,002). **Conclusion.** Le faible niveau d'éducation et les multiples partenaires sexuels sont les principaux facteurs de risque de l'infection à VIH chez les femmes enceintes. Nous recommandons de promouvoir l'éducation de la jeune fille qui est un facteur clé pour l'autonomisation des femmes.

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INTRODUCTION

In 2013, an estimated 35 million people were living with HIV (Human Immune deficiency Virus) worldwide, nearly three quarter of them in sub-Saharan Africa [1]. The prevalence of this infection varies from one continent to another and from one region to another within the same country. According to the latest demographic survey in 2011, the prevalence of HIV and AIDS (Acquired Immune deficiency syndrome) was 4.3% in the general population in Cameroon [2].

In the population of pregnant women, the average prevalence of HIV in 10 sentinel sites in Cameroon was 7.8% in 2013. The risk of HIV transmission from mother to child is 30-45% in the absence of any intervention. The Prenatal care is often the only contact opportunity with a health facility, for screening this infection. The Knowledge of status of pregnant women could reduce the risk of vertical transmission of HIV through the interventions of Prevention of mother to child [3]. The objective of this study was to determine the risk factors of HIV infection among pregnant at the maternity unit of Yaoundé Central Hospital.

METHODS

We conducted a prospective analytic cross-sectional study in the Obstetrics and Gynecology Unit of the Yaoundé Central Hospital over a period of 9 months, from 06th October 2015 to 30th June 2016. The study population consisted of all pregnant women who came for consultation at the maternity unit of Yaounde Central Hospital. We included all pregnant women who gave the consent to participate in the study. Our study variables were:

- Socio-demographic data: age, marital status, occupation, education, religion, region of origin, place of residence;
- Obstetric data: pregnancy, parity, gestational age;
- History of blood transfusions, dental, surgery, HIV in the family;

- Risk behaviors: tattoos, piercings, and multiple partners.

After a well conducted counseling, a blood sample was taken for serological analysis and the results were also recorded on the data sheet.

Each study participant was included in a special register; a unique identification number was assigned to each. Three milliliters of venous blood were taken aseptically using a 5 ml syringe at the elbow crease, then put in a dry tube previously identified. The samples were subsequently placed in tubes doors and left in ambient air for several hours to obtain serum.

We used strips (Alere Determine ™ HIV-1/2) for rapid diagnosis: the search for the HIV antibody; this test has a sensitivity of 100% and specificity for 99.89%. This is a quick immunochromatographic test for visual reading for the qualitative detection of anti HIV antibodies 1 and 2. Serum deposited on the drop zone will migrate by capillary action taking with him the reagent already present on the membrane. Serum will meet the HIV antigen already present on the membrane to provide a visible color to the naked eye.

If the anti HIV-1 and / or 2 are present, they will bind to the antigen of the conjugate selenium colloid-antigen and the antigen of the patient window by forming a red line. If HIV antibodies are absent, the conjugate through the patient window without forming a red line.

Interpretation of results

- The test is positive when two red bars appear in the patient and control zones of the strip,
- It is negative when no bar does not appear on the patient area of the strip but is present in the control area,
- The test is invalid if no red bar will appear on the 2 zones or if the bar appears only on the patient's area (Figure 1).
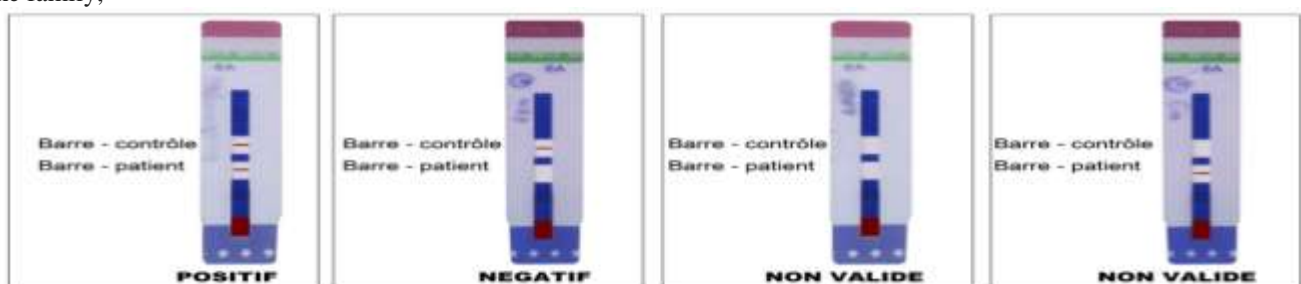

Figure 1: Possible results of the test by Alere Determine ™ HIV -1/2

For those reactive to HIV determines a second test was done using another TDR OraQuick (OraQuick ADVANCE ® Rapid HIV -1/2 Antibody Test).
The results were given to each participant after post-test counseling.
A review report was presented for confirmation to the Centre Pasteur of Cameroon. The results of the tests made at Centre Pasteur of Cameroon were all consistent with ours.

These reactive HIV were transferred to the day's hospital of Yaounde central hospital for antiretroviral therapy for life. The non-reactive women were advised to do a control test after 3 months.

Statistical analysis

The data collected were compiled on pre-established forms. They were subsequently returned to a database built with Epidata Entry version 3.1 software. Microsoft

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Excel 2007 software, Epidata analysis Version 3.2 and STATA version 12.0 Transfer were used for data analysis. The descriptive analysis was used to calculate the frequencies, means, medians and standard deviation. The statistical test of chi-2 and the Fisher's exact test were used to compare the frequencies with a threshold of significance α = 5%. The α error threshold was set at 5% as statistically significant for each variable studied. The association between risk factors and each infection was done with the report of coastline (or odds ratio) expressed with its 95% confidence interval. The study of the association was made by univariate analysis at first, then logistic regression to eliminate confounding factors.

Ethical considerations
Our project protocol was previously submitted to the Ethics Committee of the University Of Douala / Faculty of Medicine and Pharmaceutical Sciences for obtaining ethical clearance. We also received the authorization of research from the administration of Yaounde Central Hospital. Women were clearly informed of the object of our study and their consent was obtained before inclusion in our study. The collected data served only for the study and the anonymity was preserved

RESULTS
During the study period, we received 1125 pregnant women. We deleted 225 duplicates and 540 patients who did not give their consent to participate in the study. We finally analyzed a total 360 women.

Prevalence of HIV infection among pregnant women
From 360 pregnant women, 47 had positive serology of HIV, given a prevalence of 13.1%.

Sociodemographic risk factor of HIV infection
2.1 We found a statistically significant difference between the 2 groups were observed in the age group of 30-34 years, levels of primary and secondary education and the student (Table I)

Table I: Socio-demographic characteristics of the study population

Variables	Number N=360	HIV Positive(%) 47(13.1)	HIV Negative(%) 313(86.9)	OR (IC95%)	P-value
Age(years)					
15-19	12	0	12(100)	NA	
20-24	96	5(5.2)	91(94.8)	1.93 (0.84-3.04)	0.06
25-29	119	12(10.1)	107(89.9)		
30-34	82	22(26.8)	60(73.2)	**4,18 (4.7-6.21)**	**<0.001**
35-39	41	6(14.6)	35(85.4)	2.14 (0.79-5.78)	0.171
40+	10	2(20.0)	8(80.0)	1.47 (0.29-7.45)	1.000
Marital Status					
Married	246	35(14.2)	211(85,8)	1,41(0,70-2,83)	0,401
Single	114	12(10.5)	102(89,5)		
Level of education					
Primary	30	14(46.7)	16(55,3)	**3,60 (1,57-8,24**	**0,0007**
Secondary	163	25(15.3)	138(84,7)	**4,83 (2,10-11,12)**	**<0,01**
Universities	167	8(4.8)	159(95,2)		
Profession					
Remunerated	148	21(14.2)	127(85,8)		
Student	145	6(4.1)	139(95,9)	**3,83 (1,50-9,79)**	**<0,01**
House wife	67	20(29.9)	47(70,1)	1,1 (0,19-1,78)	0,6
Region of origin					
West	145	12(8.3)	133(91,7)		
Centre	139	26(18.7)	113(81,3)	0,92(0,27-3,12)	0,58
Littoral	34	4(11.8)	30(88,2)	1,73 (0,56-5,33)	0,451
South-west	14	1(7.1)	13(92,9)	2,99 (0,37-23,90)	0,466
Nord	13	1(7.7)	12(92,3)	2,76 (0,34-22,19)	0,465
East	11	3(27.3)	8(72,7)	1,02 (0,33-3,16)	0,96
Others	4	0	4(100)	_	
Residency					
Urban	351	45(12.8)	306((87.2)	0,9 (0,10-2,56)	0,33
Rural	9	2(22.2)	7(77.8)		
Religion					
Christian	336	45(13.4)	291(86.6)		
Muslim	21	1(4.8)	20(95.2)	3,09 (0,41-23,61)	0,496
Other	3	1(33.3)	2(66.7)	0,31 (0,03-3,48)	0,355

Obstetric risk factor of HIV infection
There was a statistically significant difference between the groups of primigravida and pauciparous (Table II).

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Table II: Obstetric characteristics of the study population

Variables	Number N=360	HIV		OR (CI 95 %)	P-value
		Positive (%) 47(13.1%)	Negative (%) 313(86.9%)		
Gravidity					
Primigravida	91	1(1,1)	90(98,9)	**0,84 (0,79-0,89)**	**<0,0001**
Multigravida	269	46(17,1)	223(82,9)		
Parity					
Nulliparous	117	5 (4,3)	112(95,7)		
Primiparous	94	12 (12,8)	82(87,2)	0,54 (0,25-1,16)	0,136
Pauciparous	108	23(21,3)	85(78,7)	**3,1 (2,5-3,61)**	**0,002**
Multiparous	25	5(20)	20(80)	1,08 (0,37-3,20)	1,000
Grand multiparous	16	2(12,5)	14(87,5)	1,89 (0,4-8,94)	0,523
Gestational age					
1st trimester	84	12(14,3)	72(85,7)	1,18 (0,54-2,58)	0,688
2nd trimester	131	17(13,0)	114(87,0)	1,1 (0,23-2,54)	0,48
3rd trimester	145	18(12,4)	127(87,6)	1,05 (0,52-2,14)	1,000

Risk behaviors and HIV infection

There was a statistically significant higher risk in two groups : tattoo and multiple sexual partners (Table III)

Logistics regression

Table III: Risk behavior of the population study

Variables	N=360	HIV+ n= 47	HIV- n= 313	OR (CI 95%)	P-value
Blood transfusion					
Yes	25	3(12,0%)	22(88,0%)	0,90 (0,26-3,14)	1,000
No	335	44(13,1%)	291(86,9%)		
Tattoo					
Yes	31	9(29,0%)	22(71,0)	**3,13 (1,34-7,30)**	**0,017**
No	329	38(11,6%)	291(88,4%)		
Scarification					
Yes	107	18(16,8%)	89(83,2%)	1,56 (0,83-2,95)	0,174
No	253	29(11,5%)	224(88,5%)		
Piercing					
Yes	9	2(22,2%)	7(77,8%)	1,94 (0,39-9,65)	0,332
No	351	45(12,8%)	306(87,2%)		
Multiple sexual Partners					
Yes	36	13(36,1%)	23(63,9%)	**4,82(2,24-10,38)**	**0,0002**
No	324	34(10,5%)	290(89,5%)		
Dental care					
Yes	94	8(8,5%)	86(91,5%)	0,54 (0,24-1,21)	0,155
No	266	39 (14,7%)	227(85,3%)		
Recent surgery					
Yes	47	5(10,6%)	42(89,4%)	0,77 (0,29-2,05)	0,816
No	313	42(13,4%)	271(86,6%)		
Family history of HIV					
Yes	34	13(38,2%)	21(61,8%)		
No	203	20(9,9%)	183(90,1%)	NA	0,0001
Not known	123	14(11,4%)	109(88,6%)		

After logistic regression, the level of primary education and multiple sexual partners are risk factors of HIV infection in pregnant women (Table IV)

Table IV: Logistic regression risk factor of HIV infection

Variables	OR	IC95%	P-value
Primary level of education	7,97	2,23-28,49	0,001
Multiple sexual partners	4,79	1,79-12,79	0,002

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DISCUSSION

Prevalence of HIV infection

The prevalence of HIV infection in pregnant women was 13.1% in the maternity of the Yaoundé Central Hospital. This result was far superior to that found by Billong et al in 2012 (7.8%) during their study in 10 sentinel sites in Cameroon [4], also some studies in some African countries including the Democratic Republic of Congo 2013 (4.3%) [5] and (6.6%) in 2014 in Ethiopia. [6]

The difference of our results compared to Billong and al can be explained by the fact that we recruited only pregnant women attending health facility while Billong et al did a community based study. [4]

This high prevalence can also be explained by the fact that the maternity of YCH is a reference centre in the Yaounde town for the prevention of mother to child transmission where we can found well trained staff.

Our result is similar to the foundings of Fouedjio et al who reported in 2012 , a prevalence of 11.26% among women who delivered in YCH. [7]

This result is also close to that of Kasenga et al that in 2009 in a rural area of Malawi found themselves an HIV prevalence of 15.6% in pregnant women. [8]

Risk Factors of HIVinfection

Concerning age, the age group of 25-34 years was significantly associated with HIV. Okerentugba et al in 2015 in Nigeria found that age was associated with HIV in pregnant women. [9] This same age group 25-34 years was also found to be associated with HIV in a study in 2011 in Tanzania [10]. The high prevalence of HIV in this age there can be explained by the fact that, at this age women are sexually very active and therefore very vulnerable to HIV. According to the education level, the primary level was statistically associated with HIV even after multivariate analysis. Billong et al [4] also found a high prevalence of HIV in this group during their sentinel study in Cameroon in 2012. This result is similar to the latest EDS-MICS 2011 of Cameroon who found a higher prevalence HIV among women with a primary level of study [2]. Another sentinel study in Haiti in 2007 found the same result [11]. This could be explained by the fact the level of education is correlated to the understanding the health education messages issues on advantages of good behaviors and behavior changes.

Concerning occupation, HIV-infected women in this study were mostly housewives.

Billong et al [4] found that women with low incomes were most affected with HIV. In 2008, a study in Mali reported the same result. [12]

According to obstetric characteristics, pauciparity was significantly associated with HIV. While the primigravida and nulliparity were protective factors.

We could not find any information in the literature on the influence of gender and pregnancy on the incidence of HIV. Nevertheless we can explain this result by the fact that high parity stems from multigravida and being multigravida proves a multiplicity of unprotected sex that increase the risk of becoming infected with HIV.

The analysis of risk behavior demonstrated that multiple sexual partners and tattoos were associated with HIV. Bankole also found that these factors are associated with HIV in Nigeria in 2012 [13].

Study limitations

The study was conducted in health facility, the Maternity; therefore the results cannot be generalized because they arised from hospital based data.

CONCLUSION

The low level of education and multiple sexual partners were significantly associated with HIV infection. We recommend the education of the girls which is a key factor for the empowerment of women.

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