Original Article

Characteristics of pregnant women who seroconvert after an initial negative Human Immunodeficiency Virus test result at antenatal booking at selected hospitals in Lusaka, Zambia

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ABSTRACT

Objectives: To explore the characteristics of pregnant women who seroconvert after a negative HIV test result at antenatal booking at selected hospitals in Lusaka, Zambia.

Methods*:* This was a case control study conducted at the Women and Newborn Hospital and selected level 1 hospitals in Lusaka district between July 2018 and June 2019. Convenience sampling was used. Interviews were conducted using a structured interviewer administered questionnaire involving 47 women who seroconverted (as cases) and 140 women who did not seroconvert (as controls).

Results: The study found that monthly income, age at sexual debut, number of sexual partners in a lifetime, children with the same father, partners who did not test for HIV before ANC booking, partner perceived to be faithful, frequent travel in partner and less than four ANC visits were associated with HIV seroconversion. However, when these factors where adjusted in multivariate logistic regression for confounders, women who had sexual debut before the age of 16 years were seven times more likely to seroconvert (AOR=6.67, 95%CI=1.103-39.805, P=0.039), those whose partners tested for HIV before ANC booking were 72 percent less likely to seroconvert (AOR=0.278, 95%CI=0.089-0.865, P=0.027), those who partners travelled out of town frequently were three times more likely to seroconvert (AOR=3.250, 95%CI=1.063-9.935, P=0.039) andthose who attended less than four ANC visits were three times more likely to seroconvert (AOR=3.378, 95%CI=1.018-11.210, P=0.047).

Conclusion: Pregnant women are at risk of seroconverting during pregnancy leading to MTCT of HIV. It is therefore imperative that HCT be strengthened during ANC and labour. Targeting adolescents with sexual and reproductive health education before they start engaging in sexual activities is key to keeping them HIV negative. Pre-exposure prophylaxis should be provided to pregnant women whose partners decline HCT or are HIV positive. Frequent travellers should be educated to practice safer sex. Lastly, there is need to implement the WHO 2016 ANC recommendation of at least 8 contacts during pregnancy.

INTRODUCTION

Mother-to-child transmission (MTCT) of HIV is crucial to the HIV pandemic. The Joint United Nations Programme on HIV and AIDS (UNAIDS) reported that in 2016 an estimated 160 000 children were newly infected with HIV, and an estimated 3.1

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million children were living with HIV globally.[1] Over 90% of these infections occur through MTCT.[2] The prevention of mother-to-child transmission (PMTCT) of HIV in many settings has been focused mainly on women who are HIV positive at their first antenatal visit with little attention to new seroconverter`s.[3] According to the National Institute of Health (NIH), HIV seroconversion is the transition from infection with HIV to the detectable presence of HIV antibodies in the blood.[4] When seroconversion occurs (usually within a few weeks of infection), the result of an HIV antibody test changes from HIV negative to HIV positive.[4] According to Nyoyoko and Umoh there is uncertainty regarding the contribution to overall MTCT rate from mothers who seroconvert after their first antenatal visit.[5] The prevention of HIV transmission in mothers who seroconvert after initial antenatal screening, in late pregnancy or while breastfeeding remains challenging.[5] Acutely infected pregnant women have a higher risk of transmitting HIV to their children.[6]

MTCT of HIV occurs when HIV is transmitted to the baby during pregnancy, labour or delivery, or after delivery through breastfeeding.[7] In the absence of any interventions, transmission rates range from 15-45%, but reduce to less than 5% with appropriate interventions (WHO, 2017). In Zambia, in 2016, it was observed by UNAIDS (2017) that an estimated 8 900 children were newly infected with HIV due to MTCT. In many studies, varied characteristics of pregnant women who seroconvert have been observed.[5,8-10]

Characteristics of the pregnant women who seroconvert in Lusaka district, Zambia are not well known. Determining the characteristics of pregnant women who seroconvert is a useful first step towards the development of strategies to decrease HIV acquisition by both mothers and infants.[10] Therefore, this study sought to establish the characteristics of pregnant women who seroconvert after initially testing HIV negative at selected hospitals in Lusaka district. This ensure that all HIV positive pregnant mothers are identified timely and appropriate interventions to contribute to the elimination of MTCT are instituted.

METHODS

This was an unmatched case control study conducted at the Women and Newborn hospital, and selected first level hospitals namely Kanyama, Chawama and Chilenje. The study duration was twelve months, from July 2018 to June 2019. The sample size was 187 participants, 47 cases and 140 controls. Cases were pregnant women who seroconverted after an initial negative HIV test result at ANC booking. Controls were hospital based pregnant women with a negative HIV result at ANC booking who did not seroconvert following repeat HIV tests. Convenience sampling was employed. Data was collected using a structured questionnaire which was tailored to the conceptual framework and objectives.

RESULTS

A p-value of 0.05 was used to determine the significance of the findings. Descriptive results were subjected to bivariate, multivariate and backward logistic regression using SPSS version 25.

Table 1: Bivariate analysis of socio-economic and demographics characteristics of pregnant who seroconverted during ANC.

	Total N	Group Controls n	%	Cases n	%	p
Age in years						0.881
Less than 20	16	12	8.6	4	8.5	
20 – 35	142	105	75.0	37	78.7	
Greater than 35	29	23	16.4	6	12.8	
Marital status						0.511
Married	164	121	86.4	43	91.5	
Single	23	19	13.6	4	8.5	
Occupation						0.165
Unemployed/housewife	82	60	42.9	22	46.8	
Self employed	54	39	27.9	15	31.9	
Employed	48	40	28.6	8	17.0	
Student	3	1	0.7	2	4.3	
Monthly income in kwacha						0.009
<1000	89	63	45.0	26	55.3	
1001-5000	72	52	37.1	20	42.6	
5001-10000	26	25	17.9	1	2.1	

TABLE 2: Bivariate analysis of health and reproductive characteristics of pregnant who seroconverted during ANC.

	Total N	Controls n	%	Cases n	%	p
Number of times pregnant						0.574
Once	46	37	26.4	9	19.1	
2 – 3	82	59	42.1	23	48.9	
4	59	44	31.4	15	31.9	
Age in years at first pregnancy						0.173
Less than 20	65	42	39.6	23	53.5	
20 – 35	84	64	60.4	20	46.5	
Age in years at first sex act						0.007
Less than 16	19	12	9.0	7	15.6	
16 – 19	89	60	44.8	29	64.4	
>20	71	62	46.3	9	20.0	
Sexual partners in lifetime						0.001
Three and above	65	40	28.6	25	53.2	
Two	48	33	23.6	15	31.9	
One	74	67	47.9	7	14.9	
Children have same father						0.003
Yes	97	78	80.4	19	52.8	
No	36	19	19.6	17	42.2	

TABLE 3: Bivariate analysis of socio-behavioural characteristics of pregnant who seroconverted during ANC.

	Total N	Controls n	%	Cases n	%	p
Partner tested for HIV before ANC booking						<0.001
Yes	117	101	72.7	16	34.8	
No	68	38	27.3	30	65.2	
Partner is faithful						<0.001
Yes	125	109	77.9	16	34.8	
No	61	31	22.1	30	65.2	
Partner treated for urethral discharge						0.486*
Yes	15	11	8.5	4	13.3	
No	144	118	91.5	26	86.7	
Partner is frequent traveler						<0.001
Yes	58	33	23.9	25	53.2	
No	127	105	76.1	22	46.8	

TABLE 4: Bivariate analysis of utilization of health services of pregnant who seroconverted during ANC.

	Total N = 187	Controls n	%	Cases n	%	p
Gravida						0.710
1	44	35	25.0	9	19.1	
2 – 3	87	64	45.7	23	48.9	
4	56	41	29.3	15	31.9	
Parity						0.610
0	46	37	26.4	9	19.1	
1 – 3	120	88	62.9	32	68.1	
4	21	15	10.7	6	12.8	
Gestation age						0.250
<16	93	72	51.4	21	44.7	
16 – 20	71	54	38.6	17	36.2	
>20	23	14	10.0	9	19.1	
ANC Visits						<0.001
<4	43	23	16.4	20	42.6	
4 and above	144	117	83.6	27	57.4	

TABLE 5: Logistic regression of characteristics of pregnant women who seroconverted during ANC.

	OR	95%CI Lower	Upper	p	AOR	95%CI Lower	Upper
Monthly income (Kwacha)							
<1000	10.317	1.328	80.171	0.026	3.146	0.263	37.588
1001 – 4999	9.615	1.220	75.762	0.032	2.315	0.210	25.560
5000 - 10000	1.000				1.000		
Age had first sex							
<16	4.019	1.253	12.886	0.019	6.627	1.103	39.805
16 – 19	3.330	1.455	7.619	0.004	2.389	0.580	9.836
20	1.000				1.000		
Number sexual partners in lifetime							
3	5.982	2.372	15.088	<0.001	2.383	0.556	10.206
Two	4.351	1.618	11.700	0.004	3.305	0.817	13.376
One	1.000				1.000		
Children have same father							
Yes	0.272	0.119	0.621	0.002	0.661	0.179	2.436
No	1.000				1.000		
Partner tested for HIV before ANC booking							
Yes	0.201	0.098	0.409	<0.001	0.278	0.089	0.865
No	1.000				1.000		
Partner is faithful							
Yes	0.152	0.073	0.314	<0.001	0.515	0.159	1.670
No	1.000				1.000		
Partner is frequent traveler							
Yes	3.616	1.807	7.236	<0.001	3.250	1.063	9.935
No	1.000				1.000		
ANC visits							
<4	3.768	1.814	7.826	<0.001	3.378	1.018	11.210
4	1.000				1.000		

DISCUSSION

This study found that there is a significant association between age at sexual debut before 16 years, partner not testing for HIV before ANC booking, frequent out of town travel in partner, attending less than four ANC visits and HIV seroconversion.

Age was not statistically significant for HIV seroconversion, p-value was 0.881. This could be explained by the fact that age categories which were considered in this study were broad compared to the studies done in other countries. Most of the studies indicate that the majority of women who seroconverted were in the age range of 20-30 years.[5,8,11,13] This correlates with the period of increased sexual activity.[14]

Marital status was not significantly associated with HIV seroconversion, p-value = 0.511. This study suggests that there is no difference in sexual behaviour between women who are married and those who are not married. However, Moodley and friends observed that marital status has a significant association with HIV seroconversion.[12] This is similar to the study by Wand where they found that lack of cohabitation was associated with HIV seroconversion in over 80 per cent of the cases.[15]

There was a significant relationship between HIV seroconversion and the monthly income (p=0.026; OR 10.317; 95% CI 1.328-80.171). However, there was no significant association after adjusting for confounding factors (adjusted p value of 0.365). This is in conflict with other studies which suggest that low income earning women are more likely to engage themselves in illicit sexual activities and therefore more likely to seroconvert. Hargreaves argued that it is more difficult for pregnant women who are financially dependent on their partners to apply their knowledge, exercise control over their sex life and negotiate for safer sex, thus placing themselves at greater risk of acquiring HIV.[17]

For age at sexual debut, this study found that women who had sex before the age of 16 years were 7 times more likely to seroconvert (pAdj=0.039; CI 1.103-39.805) compared to those who had sexual debut at 20 years and older. This suggests that individuals who start having sex before the age of 16 continue to have sex, and are less likely to be mindful of preventive measures to acquiring HIV. Delaying sexual debut is very important in the reduction of HIV incidence especially among young women.[8] Retaining a girl child in school for longer duration may contribute significantly to reduction of HIV acquisition because each year a girl child stays in school, she gains greater independence and becomes empowered to make decisions regarding her sexual life.[16,17]

Women with partners who tested for HIV before ANC booking were less likely to seroconvert compared to those whose partners did not test for HIV (p<0.001; CI 0.098-0.409). When logistic regression was performed and adjusted for confounders, they were found to be 72 per cent (AOR 0.278) less likely to seroconvert. This could be explained by the fact that partners who test for HIV are counselled on how to protect themselves from acquiring HIV. According to Kikumbih, HIV testing aimed at prevention of horizontal and vertical transmission during pregnancy requires communication and support from within the couple.[18] Pre-exposure prophylaxis for HIV should be made available in high HIV prevalent areas for pregnant women whose partners refuse HIV testing or who have an unknown HIV status.[8]

Travel in partner was also found to be significantly associated with HIV seroconversion in pregnancy in this study. After adjusting for confounders, it was noted that women whose partners travelled frequently were 3 times more likely to seroconvert compared to women whose partners did not travel frequently (pAdj=0.039; CI 1.063-9.935). This can be explained by the fact that partners engage in casual sexual relationships when they travel. This is consistent with the study done in South Africa, which suggested that frequent travellers who are away from home for longer periods of time are more likely to engage in risky sexual behaviour because they establish other sexual networks.[19]

Attendance of ANC is a pivotal component of a woman's experience of pregnancy. This study found that women who had less than four ANC visits were 3 times more likely to seroconvert compared with those who had more than four visits (pAdj=0.047; CI 1.018-11.210). This implies that women who attend less than four ANC visits miss out on the lessons their colleagues receive on how to protect themselves from HIV infection and subsequently seroconverting. The importance of early initiation of ANC can be an integral part of health education for all pregnant women so that they can come early for ANC even in subsequent pregnancies.[8]

CONCLUSION

Pregnant women are at risk of seroconverting during pregnancy leading to MTCT of HIV. It is therefore imperative that HCT be strengthened during ANC and labour. Targeting adolescents with sexual and reproductive health education before they start engaging in sexual activities is key to keeping them HIV negative. Pre-exposure prophylaxis should be provided to pregnant women whose partners decline HCT or are HIV positive. Frequent travellers should be educated to practice safer sex. Lastly, there is need to implement the WHO 2016 ANC model of at least 8 contacts during pregnancy.

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