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Investigating factors associated with uptake of HIV voluntary counselling and testing among pregnant women living in North Uganda

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Abstract

We investigated factors potentially associated with the uptake of HIV voluntary counselling and testing (VCT), which is the first step in acceding to programmes for the prevention of mother-to-child transmission of HIV infection. For the period 2001–2003, we estimated the VCT uptake among the 12,252 first-time attendees of the Antenatal Clinic (ANC) at Lacor Hospital (Gulu District, North Uganda). Associations between VCT uptake and socio-demographic characteristics and reproductive history were evaluated using log binomial regression models. VCT uptake was 55.6% for the overall study period; it increased from 51.0% in 2001 to 58.6% in 2002 and 57.7% in 2003 ($P < 0.001$). Having some education [primary versus none, adjusted prevalence proportion ratio (PPR) = 1.05, 95% confidence intervals (CI): 1.00–1.10] and being unmarried (cohabitating, PPR = 1.07, 95% CI: 1.03–1.10; single/widowed/divorced, PPR = 1.10, 95% CI: 1.03–1.18) were significantly associated with VCT uptake. Associations of borderline significance were found for: recent change of residence, having a partner with a modern occupation, and past use of contraceptives. VCT uptake is still low in this district of North Uganda. Although some socio-demographic factors were found to have been associated with uptake, the associations were weak and not of public-health significance.

Introduction

According to UNAIDS, in 2004 approximately 640,000 children under 15 years of age were newly infected with HIV, mainly as a result of mother-to-child transmission (MTCT). The majority of these children were born to mothers in sub-Saharan Africa, where at the end of 2004 an estimated 13.3 million women of childbearing age were HIV-positive (UNAIDS/WHO 2004). In breastfeeding populations, MTCT rates, in the absence of interventions, range from 20% to 45%. In resource-poor settings, where elective caesarean section and formula-feeding are not viable options, the MTCT rate can be reduced to less than 10% through the use of antiretrovirals (De Cock et al., 2000; Newell, 2001; WHO, 2004). These drugs have been shown to be well tolerated by African women, and their relatively low cost has meant that antiretroviral-based MTCT interventions are feasible even in resource-poor countries (Dabis & Ekpini, 2002).

In Uganda, although HIV-1 prevalence sharply decreased in the 1990s, it is still quite high. In 2002, an estimated 6.2% of pregnant women attending antenatal clinics (ANC) were HIV-positive (STD/AIDS Control Programme, 2003), and MTCT is considered to be the second most common mode of HIV-1 transmission, accounting for approximately 15% of new infections (Garbus & Marseille, 2003). To address this situation, in 2000, the Ugandan Ministry of Health established a national programme for preventing MTCT through short-course drug regimens and within a context of comprehensive antenatal, labour and postnatal care services (Ugandan Ministry of Health, 2003a).

By the end of 2003, 38 of Uganda's 56 districts had at least one ANC that had implemented this programme (Ugandan Ministry of Health, 2003b). One of the first ANCs to participate was that of St. Mary's Hospital Lacor, which is located in the Gulu District of northern Uganda, which borders on Sudan. Approximately 75% of the District's population lives in rural areas. Most of these persons have been internally displaced in protected camps, as a consequence of the violent ongoing civil strife which began in 1986 (UBOS, 2005; UNOCHA, 2002). As of July 2003, there were 33 protected camps in the Gulu District, with a population of approximately 380,000 (UNOCHA, 2003). Most of these camps' inhabitants belong to the

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Acholi Tribe, whose members constitute nearly the entire population of the District. According to Uganda's national HIV-1 surveillance system, the estimated HIV-1 prevalence among attendees of the ANC of the St. Mary's Hospital Lacor was 11.9% in 2002, the highest among the 20 ANC sentinel sites in Uganda.

One of the first steps in participating in an MTCT prevention programme is voluntary counselling and testing (VCT), and low uptake of VCT can be a major problem in implementing such programmes, as has been the case in Uganda (Garbus & Marseille, 2003). Thus to increase enrolment, the factors that influence VCT uptake need to be investigated, and knowledge of these factors could be useful in developing targeted campaigns for specific sub-populations. The objective of the present study was to investigate the factors associated with VCT uptake among women attending the ANC of the St. Mary's Hospital Lacor.

Methods

The analysis was conducted among first-time attendees of the ANC of the St. Mary's Hospital Lacor in the period from 2001 to 2003. A first-time attendee was defined as a women presenting for the first time at the clinic during her pregnancy. During the study period, there were 14,104 first-time attendees. At the first visit, all attendees were provided with general health education and were briefly informed of the MTCT prevention programme. All women were asked to provide verbal consent for being interviewed. Information on socio-demographic characteristics and reproductive history was collected by midwives through a standardized questionnaire; this information was entered in an anonymous database.

All 14,104 women agreed to be interviewed, and all but 8 provided a blood sample for routine syphilis testing and other routine examinations. The 12,252 (86.9%) women who returned two days later for the results of the syphilis test attended group counselling on MTCT, during which they were offered VCT.

HIV-1 testing was performed on the sera leftover from syphilis testing, using an algorithm based on rapid tests. Within one hour of testing, the results and post-test counselling were provided. Those women who tested positive were given an appointment at 34 weeks of gestation to enrol them in the MTCT prevention programme and to distribute Nevirapine.

We measured VCT uptake among all 12,252 women, according to socio-demographic characteristics (i.e. age, place and duration of current residence, educational level, occupation, marital status, and age and occupation of partner) and reproductive history (i.e. parity and history of contraceptive use). Differences in VCT uptake were evaluated with a univariate analysis, using the chi-square test with the continuity correction or the chi-square test for linear trend, when appropriate. Factors associated with VCT uptake were evaluated with a multivariate analysis, using log-binomial regression models (Skov et al., 1998). The prevalence proportion ratios (PPR) and their 95% confidence intervals (CI) were used to describe the strength of the associations. Statistical analyses were performed using STATA 8.2 (StataCorp, College Station, TX, USA). The study was approved by the ethical committee of the St. Mary's Hospital Lacor and is based on data collected within the MTCT prevention programme, which was authorised and supported by the Uganda Ministry of Health.

Results

The socio-demographic characteristics and reproductive history of the 12,252 pregnant women who were offered VCT did not greatly differ from those of the women who did not return to the clinic to collect their syphilis test result (Table I). Of the women who were offered VCT, 6811 (55.6%) accepted. VCT uptake increased from 51.0% in 2001 to 58.6% in 2002 to 57.7% in 2003 (chi square for linear trend, $P < 0.001$).

Uptake was higher among: women who lived in urban areas; women who had lived at their current address for less than two years; women with some

Table I. Socio-demographic characteristics and reproductive history of pregnant women attending the antenatal clinic of St. Mary's Hospital Lacor (Gulu District, North Uganda, 2001–2003).

	VCT not offered (n = 1852)	VCT offered (n = 12252)
Median Age (interquartile range)	23 years (20–28)	23 years (20–28)
Acholi tribe (%)	1752 (94.7)	11809 (96.5)
Residing in the Gulu Municipality (%)	723 (39.0)	5691 (46.4)
At current residence for less than 2 years (%)	294 (17.7)	1965 (18.9)
No formal education (%)	409 (22.1)	2403 (19.6)
Traditional occupation[a] (%)	1656 (89.7)	10740 (87.9)
Married (%)	818 (48.5)	5437 (51.6)
Median difference in age with partner (interquartile range)	5 years (2–8)	4 years (2–8)
Partner with traditional occupation[a] (%)	959 (52.4)	5947 (48.8)
Primipara (%)	456 (24.7)	2827 (23.1)
History of contraceptive use (%)	282 (17.4)	2128 (20.9)

[a]Traditional occupation: agricultural worker and housewife.

education; unmarried women; women whose partner had a modern occupation; and women with a history of contraceptive use (Table II). However, in the multivariate analysis, uptake remained significantly higher only for women with some primary education (compared to those with no formal education, PPR = 1.05, 95% CI: 1.00–1.10) and unmarried women (cohabitating, PPR = 1.07, 95% CI: 1.03–1.10; single/widowed/divorced, PPR = 1.10, 95% CI: 1.03–1.18) (Table II). For the other variables that were significant in the univariate analysis, the associations were of borderline significance, except for living in an urban area, which showed no association.

According to the results of the age-specific multivariate analysis, among women less than 25 years of age, VCT uptake was higher for those with some education (primary versus none, PPR = 1.10, 95% CI: 1.02–1.18) and those who were cohabitating (PPR = 1.05, 95% CI: 1.00–1.10) (Table III). In this age group, an association of borderline significance was found for women whose partner had a

Table II. Factors associated with VCT uptake among pregnant women attending the Antenatal Clinic of St. Mary's Hospital Lacor (Gulu District, North Uganda, 2001–2003).

	Univariate analysis		Multivariate analysis	
	VCT uptake (95% CI)	P-value	Adjusted PPR (95% CI)	P-value
Age group		0.730		
<20 years	56.1 (54.2–58.0)		1	
20–24 years	55.8 (54.3–57.3)		1.03 (0.97–1.09)	0.368
25–29 years	54.9 (53.1–56.7)		0.99 (0.93–1.06)	0.786
≥30 years	56.0 (54.0–58.0)		1.03 (0.97–1.11)	0.342
Residence		0.005		
Rural	54.4 (53.2–55.6)		1	
Urban	56.9 (55.7–58.2)		1.02 (0.98–1.06)	0.289
Time of residence		0.024		
>2 years	57.1 (57.7–62.1)		1	
≤2 years	59.9 (56.0–58.1)		1.04 (1.00–1.08)	0.074
Level of education		0.009		
None	51.8 (49.8–53.8)		1	
Primary or lower (≤7 years)	56.8 (55.7–57.9)		1.06 (1.00–1.10)	0.034
Secondary or higher (>7 years)	55.4 (53.2–57.6)		0.98 (0.92–1.05)	0.604
Occupation[a]		0.670		
Traditional	55.5 (54.6–56.5)		1	
Modern	56.2 (53.6–58.7)		0.99 (0.94–1.05)	0.795
Marital status		<0.001		
Married	55.4 (54.1–56.7)		1	
Cohabitating	59.4 (57.9–60.8)		1.07 (1.03–1.10)	0.001
Single/Divorced/Widowed	61.3 (57.2–65.2)		1.10 (1.03–1.18)	0.007
Age difference with partner		0.431		
<2 years	55.5 (53.1–57.9)		1	
2–3 years	58.5 (56.6–60.4)		1.04 (0.98–1.10)	0.158
4–5 years	57.9 (55.8–60.0)		1.03 (0.97–1.09)	0.359
>5 years	57.6 (56.0–59.1)		1.02 (0.96–1.07)	0.594
Occupation of partner[a]		0.002		
Traditional	54.1 (52.9–55.4)		1	
Modern	57.0 (55.8–58.2)		1.04 (1.00–1.08)	0.073
Parity		0.708		
Primipara	55.9 (54.1–57.8)		1	
Multipara	55.5 (54.5–56.5)		1.02 (0.96–1.07)	0.594
Past use of contraceptives[b]		0.018		
None	57.0 (55.9–58.0)		1	
Traditional methods	59.6 (57.4–61.7)		1.04 (1.00–1.08)	0.080
Modern methods	66.1 (56.8–74.6)		1.14 (1.00–1.31)	0.053

PPR, prevalence proportions ratio; CI, confidence interval. [a]Traditional occupation: agricultural worker and housewife; modern occupation: clerk, business woman/man, professional, soldier, student and other. [b]Traditional contraceptive methods: abstinence or hormonal; modern contraceptive methods: condom, IUD or others.

Table III. Age-specific analysis of factors associated with VCT uptake among pregnant women attending the Antenatal Clinic of St. Mary's Hospital Lacor (Gulu District, North Uganda, 2001–2003).

	Age <25 years		Age ≥25 years	
	Adjusted PPR (95% CI)	P-value	Adjusted PPR (95% CI)	P-value
Residence				
Rural	1		1	
Urban	1.05 (0.99–1.10)	0.093	0.99 (0.93–1.05)	0.777
Time of residence				
>2 years	1		1	
≤2 years	1.04 (0.99–1.09)	0.149	1.04 (0.97–1.12)	0.297
Level of education				
None	1		1	
Primary or lower (≤ 7 years)	1.10 (1.02–1.18)	0.008	1.01 (0.95–1.08)	0.784
Secondary or higher (> 7 years)	0.99 (0.90–1.09)	0.885	1.00 (0.90–1.10)	0.962
Occupation[a]				
Traditional	1		1	
Modern	0.99 (0.92–1.07)	0.862	0.99 (0.91–1.08)	0.873
Marital status				
Married	1		1	
Cohabitating	1.05 (1.00–1.10)	0.038	1.08 (1.02–1.14)	0.005
Single/Divorced/Widowed	1.06 (0.97–1.16)	0.180	1.18 (1.05–1.33)	0.006
Age difference with partner				
<2 years	1		1	
2–3 years	1.03 (0.96–1.12)	0.385	1.05 (0.98–1.14)	0.187
4–5 years	1.05 (0.97–1.14)	0.235	1.00 (0.92–1.09)	0.961
>5 years	1.02 (0.94–1.09)	0.680	1.02 (0.94–1.09)	0.680
Occupation of partner[a]				
Traditional	1		1	
Modern	1.05 (1.00–1.11)	0.051	1.01 (0.95–1.08)	0.685
Parity				
Primipara	1		1	
Multipara	1.01 (0.95–1.07)	0.693	1.04 (0.89–1.21)	0.648
Past use of contraceptives[b]				
None	1		1	
Traditional methods	1.03 (0.97–1.10)	0.302	1.05 (0.99–1.11)	0.124
Modern methods	1.17 (0.99–1.38)	0.062	1.11 (0.88–1.39)	0.386

PPR, prevalence proportions ratio; CI, confidence interval. [a]Traditional occupation: agricultural worker and housewife; modern occupation: clerk, business woman/man, professional, soldier, student and other. [b]Traditional contraceptive methods: abstinence or hormonal; modern contraceptive methods: condom, IUD or others.

modern occupation (PPR = 1.05, 95% CI: 1.00–1.11) and those who had used modern contraceptive methods in the past (PPR = 1.17, 95% CI: 0.99–1.38). Among women who were 25 years of age or older, uptake was higher only among unmarried women (cohabitating, PPR = 1.08, 95% CI: 1.02–1.14; single/widowed/divorced, PPR = 1.18, 95% CI: 1.05–1.33) (Table III).

Discussion

Between 2001 and 2003, VCT was offered to 86.9% of all ANC attendees, and about half of them accepted (55.6%). When considering this level of uptake together with the 12% HIV prevalence estimated on a sample of the women attending this ANC selected for anonymous surveillance (STD/AIDS Control Programme, 2003), it can be calculated that approximately 850 HIV-positive-women remained untreated and at risk of transmitting the infection to their child.

In previous studies among ANC attendees in sub-Saharan Africa, the VCT uptake was at least 70% (Westheimer et al., 2004; Malonza et al., 2003; Kowalczyk et al., 2002; Kiarie et al., 2000; Cartoux et al., 1998). However, most of these studies were conducted in large urban settings and in areas that, unlike the Gulu District, have not been subjected to prolonged civil unrest. The nearly 20 years of civil unrest that has plagued the Gulu District has had a major impact on local populations and their access to, and acceptance of, healthcare services and disease-prevention programmes. Most of the District's infrastructure has been destroyed, and the

traditional family and community structures have broken down, in part as a result of the forced displacement of more than half of the population to protected camps (UNOCHA, 2003). The prolonged civil unrest has also severely affected movement within the District and has left the majority of the population unemployed and dependent on outside aid. Undoubtedly, these conditions have reduced women's access to the ANC and thus the uptake of VCT.

With regard to socio-demographic characteristics and reproductive history, some factors were significantly associated with VCT uptake. Uptake was lower for married women, possibly because these women fear that their partner or other family members will discover that they are HIV-positive (Giuliano et al., 2005; Urassa et al., 2005; Medley et al., 2004). To overcome this problem, the women's partners could be involved in the MTCT programme. Uptake was instead higher for women with some education, possibly because they better understand the potential benefits of measures for preventing HIV infection and are thus more receptive to these measures. Nonetheless, the strengths of these associations, as well as those of other factors only marginally associated with VCT uptake, were quite weak and thus would not be of great use in improving uptake. Our findings are consistent with those of previous studies, in which uptake was associated with educational level, marital status, and partner's occupation (Giuliano et al., 2005; Westheimer et al., 2004; Kowalczyk et al., 2002; Cartoux et al., 1998). However, the associations found in these studies were also quite weak, especially considering that, in many of these studies, the results were expressed as odds ratios, which overestimate the risk ratio when analysing a common outcome such as VCT uptake (Skov et al., 1998; McNutt et al., 2003; Barros & Hirakata, 2003).

A limitation of this study is that the questionnaire was not specifically designed to assess factors affecting VCT uptake and did not include other factors found to play an important role in VCT uptake in other studies, such as: the accessibility of the clinic, the woman's relationship with the staff, the confidentiality of HIV testing, the unwillingness to be made aware of positive HIV test results, the stigma attached to being HIV positive, self-perceived HIV risk, the woman's fear of her partner, and the knowledge of and attitude towards testing (Daniel & Oladapo, 2006; Urassa et al., 2005; Painter et al., 2004).

In our study, approximately 13% of all first-time ANC attendees did not undergo VCT because they did not return to the clinic at the time when it was offered (i.e. two days after the first visit, when the results of syphilis testing were provided). As mentioned, the failure to return was mainly due to the insecurity prevailing in the study area, which reduced access to the clinic. One means of overcoming this problem could be to offer VCT at the first visit. However, this is unfeasible, given that, on those days for which first visits are scheduled, approximately 50 first-time attendees are seen at the clinic and the waiting time would be too long. However, the number of women returning for a second visit could be increased by greater emphasizing of the MTCT programme at the group session on general health education conducted at the first visit. Moreover, sensitization campaigns in the community, through radio programmes, newspapers and other means, could also contribute to increasing attendance for the second visit by pointing out the MTCT programme's benefits and addressing the stigma of HIV/AIDS (Pignatelli et al., 2006; Mbago, 2004)

However, in our study, most of the women who did not undergo VCT had shown up for the second visit and directly refused HIV testing. To increase the acceptance of testing, several strategies could be attempted. Instead of group counselling, individual pre-test counselling could be performed, which could help the women to feel that testing was more confidential and to develop greater trust in the counsellor. The 'opt out' approach, which consists of offering HIV testing as part of the overall pregnancy care package (together with other routine examinations), could also be used (Bassett, 2002; De Cock & Johnson, 1998). In fact, a recent study conducted in two rural districts in Zimbabwe showed that 79% of the women who refused HIV testing in six MTCT programme sites would have accepted if the 'opt out' approach had been used (Perez et al., 2006). However, the validity of using this approach continues to be debated, especially for issues regarding stigma, spousal violence, rejection or blame from the family, and possible reduction in the proportion of women returning to collect their test result (Kippax, 2006; Rennie & Behets, 2006; Gaillard et al., 2002; Maman et al., 2002). Finally, although some doubts have been expressed (Day et al., 2003), it is reasonable to believe that making HAART available to treat mothers and partners would increase VCT uptake by removing the barrier related to the sense of impotence caused by the lack of access to effective treatment for HIV/AIDS (Giuliano et al., 2005).

In conclusion, it is clear from this study that there is a real need to improve VCT uptake at the St. Mary's Hospital Lacor. However, we were not able to identify factors that could be used to redirect VCT towards specific groups of women. Further investigation, specifically designed for this purpose, is needed.

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