HIV and syphilis serostatus of antenatals in traditional Maasai pasturalist communities in Kajiado District, Kenya: 1989–1992

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TROPICAL DOCTOR, 1999, **29**, 94–98

SUMMARY
Although much research has been carried out on high risk populations, little is known about HIV prevalence in traditional rural communities who limit contact with other tribes, non-traditional tribesman and Europeans. This study considers traditional Maasai living near a high HIV transmission area.

A time series analysis assessed the trend of HIV-1 and syphilis prevalences in the study area. Data consist of antenatal blood specimens ($n = 2082$ women) collected during 1989–1992. An estimated 100% of pregnant women residing in the study areas are included in the study. Standardized HIV-1 prevalences among women for 1989–1992 ranged between 0.95% and 2.23%. A χ^2 test for trends was not significant, analysis of age-specific prevalences revealed no significant result. Standardized syphilis prevalence varied from 1.89% to 12.82% during the 3 years. Prevalence declined in 1990, but increased significantly thereafter. A steep 1992 increase in syphilis was not associated with an increase in HIV. Chi square test for trends for age-specific syphilis was not significant. In 2082 samples only one woman was positive for both HIV and syphilis.

In 4 years no increase in HIV prevalence was detected among traditional Maasai woman living near a high transmission area. No significant variation across ages was detected. However, syphilis increased sharply in one time period, 1992. Despite the low HIV prevalence among Maasai, the higher prevalence of syphilis suggests that the HIV epidemic is at an early phase and may increase soon. It may also suggest that HIV does not yet have a high prevalence at markets where Maasai sell their herds, but is concentrated at truck stops.

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INTRODUCTION

In Kenya by 1993 more than 40 000 cases of AIDS and an estimated 800 000 HIV infections had been reported[1]. Although much research has been carried out in Kenya on high risk populations in major urban areas (e.g. prostitutes and STD patients) and among truck drivers[2–6], very little is known about HIV prevalence in traditional rural communities[7]. They are of interest because they tend to be self sufficient and limit their contact with other tribes, non-traditional tribesman and Europeans. Nevertheless, currently the Kenya National AIDS Control Program, reports an increase of HIV in rural areas[1]. Previous epidemiological surveys of HIV prevalence among antenatal patients in urban Kenya and Tanzania recorded HIV seroprevalences between 3.1% to 30%[6,8–13]. Rural studies in Kenya and Tanzania exhibit HIV prevalence between 0.5% and 4.5%[7,12].

This study, approved by the Government of Kenya after standard ethical and scientific review, assesses HIV prevalence in traditional Maasai communities living in high HIV transmission areas situated near major truck routes. Bantu speaking communities and non-traditional Maasai communities living along these roads have exhibited high HIV prevalence. The epidemiological question is whether communities with diverging cultural and behavioural patterns, yet living in close proximity to high transmission areas, have similar HIV prevalence, or because of their cultural separation exhibit less HIV. One study of 308 Maasai women in northern Tanzania suggests this may be the case[14]. This current study measures HIV prevalence longitudinally during 1989 to 1992. A similar assessment is made of syphilis.

Although this paper explores whether maintaining one's culture and lifestyle may result in a lower HIV prevalence, this is not to say that Maasai exhibit low risk sexual patterns. On the contrary, recent work reported that Maasai men living traditional lifestyles have many sexual partners annually. A study of 132 Maasai men questioned yearly for 3 years showed a mean number of sexual contacts of 11.5, 11.4 and 12.4 for each year. The range was 0 to 45 partners for a year. Maasai may, therefore, be at very high risk should their communities become infected with HIV[15].

METHODS

The Nomadic Health Unit (NHU) of the African Medical and Research Foundation (AMREF) collected blood specimens during antenatal services provided by a mobile clinic to traditional Maasai pasturalists in Kajiado District. Client visits were free of charge and available to all who demanded service. Most and presumably nearly all pregnant Maasai women in the vicinity visit mobile units for antenatal care.

We assume this high coverage because over many years the NHU had become a well-known and accepted institution among Maasai. During this time the NHU attempted to determine whether pregnant women were

Table 1. Annual HIV and syphilis prevalence among antenatal Maasai women during 1989–1992 in Kajiado District

Year	N	*Standardized HIV+ prevalence (%)*	*Confidence interval (±%)*	*OR**	*Standardized VDRL+ prevalence (%)*	*Confidence interval (±%)*	*OR†*
1989	551	0.95	1.12	1.00	2.19	2.03	1.00
1990	581	1.12	0.81	1.52	1.89	1.07	1.11
1991	648	2.23	1.40	2.41	5.60	1.97	2.8
1992	302	0.99	1.57	1.47	12.82	4.60	6.08
Total	2082	1.32	0.57		4.78	1.11	

*$\chi^2 = 1.35$; $P = 0.25$
†$\chi^2 = 41.67$; $P = 0.00$
OR = Odds ratio; VDRL = Venereal Disease Research Laboratory

being missed. The NHU was constantly interested in improving its service provision strategy that was to establish a camp and clinic for several days near Maasai encampments. They moved to the next encampment after a few days when no other women requested services. The Maasai tended to assure the NHU that all of the known pregnant women in the area were being attended. The NHU has Maasai health staff who communicated easily with clients and we presume they received accurate comments. As there is no census of Maasai groupings and they are migratory, such reports are the best available data. Nevertheless, we assume that it must include some error.

Clinicians gathered specimens monthly during 1989–1991; 1992 includes data for the first 6 months only. During routine antenatal profile determination, a clinician extracted 3–5 ml of blood from each woman by venepuncture. Specimens were tested in the field for Venereal Disease Research Laboratory (VDRL) positivity as a guide to treating antenatal patients with penicillin to prevent congenital syphilis; the NHU may have treated many patients unnecessarily due to the low test specificity. The remaining specimens were then stored in field liquid nitrogen, transported, and stored in the main AMREF laboratory in Nairobi at −20°C. Resulting numbers of specimens for 1989–1992 were: 551, 581, 648, 302, respectively.

Three laboratory technicians, trained for this study, tested the 2082 blinded specimens for HIV using a synthetic peptide ELISA (Enzygnost Anti-HIV-1+2, Behringwerke). All positive and equivocal results were re-tested. Specimens with absorbance values within or above the calculated range in a test and a retest were judged positive. Neither Western Blot nor a comparable ELISA were used as confirmation tests due to price constraints in Kenya for the former and because the latter were not available through the Ministry of Health in Kenya at the time of the study. However, as the test results were intended for research purposes rather than for patient diagnosis, the use of the Enzygnost alone should have no effect on this study. The prevailing measurement of sensitivity and specificity of the Enzygnost test with African specimens (i.e. 100% and greater than 99%, respectively[16–18]) suggests that of the 31 HIV+ results detected in this study, at most 0.2 false positives could result. This potential error could not affect this analysis. At the time HIV tests were carried out, the samples were again tested for syphilis using reagin card tests (VDRL). Trenonema pallidum haemagglutination (TPHA) was used for confirmation.

All data were standardized using the direct method. The Kajiado female population distribution was derived from the national 1979 census. Patient ages were calculated from birth dates recorded in their national identity cards. Nineteen women who did not have cards and did not know their ages were designated as 'adults'. In data analysis we assumed that the distribution of ages in these 'adults' was the same as in the population as a whole. They were therefore assigned to age groups using weights derived from the 1979 census. One HIV+ result occurred in this adult group during 1992. This positive result was also distributed across age groups using the same method.

Although approved by the Government of Kenya, this research is sensitive. At the time the bloods were drawn, women were told their blood was taken for syphilis testing to inform the clinical decision about whether or not to use penicillin therapy. As stated, the remaining blood was stored at AMREF in a specimen database. At the time data were collected, AMREF was not a testing site for HIV and did not test clients for HIV. The current study was neither planned nor envisioned at that time. As a result, the women were not informed that their blood, albeit blinded, would be later tested for HIV. Had a Maasai client wanted to be tested for HIV during 1989–1992 or from then to the current time, they could have been referred to one of several accessible HIV testing sites in Nairobi. Counselling was available at these testing sites and at several local non-governmental organizations. NHU did not perform HIV testing as part of its regular antenatal services.

RESULTS

Standardized HIV-1 prevalences for 1989–1992 (Table 1) reveal low HIV prevalence with no consistent positive

Table 2. Age-specific HIV and syphilis prevalence among antenatal Maasai women during 1989–1992 in Kajiado District

Year	Adjusted N	HIV+ prevalence (%)	Confidence interval (±%)	OR*	VDRL+ prevalence (%)	Confidence interval (±%)	OR†
15–19	305.63	0.74	0.96	1.00	6.48	2.76	1.00
20–24	750.65	1.63	0.91	2.47	4.62	1.50	0.70
25–29	714.18	1.57	0.91	2.38	4.56	1.53	0.69
30–34	187.48	1.67	1.83	2.46	3.42	2.60	0.47
35–39	92.56	2.28	3.04	3.34	6.83	5.14	0.99
40+	31.50	0.27	1.81	0.00	0.81	3.13	0.00
Total	2082	1.32	0.57		4.78	1.11	

*$\chi^2 = 0.43$; $P = 0.51$
†$\chi^2 = 1.80$; $P = 0.18$
See Table 1 for key to abbreviations

trend. Standardized prevalences ranged between 0.95% and 2.23%. During 1990 HIV prevalence increased 0.17%, and by 1.11% in 1991. However, during 1992 prevalence declined in antenatal Maasai women by 1.24%. Chi square tests for trend revealed no significant result for the 1989–1992 (Table 1) and 1989–1991 periods ($\chi^2 = 3.179$, $P = 0.075$), thereby suggesting that this fluctuation could be attributed to measurement error. Analysis of age specific prevalence was performed on the aggregate data, also revealing no significant result (Table 2).

In the sample of Maasai women standardized syphilis prevalence varied from 1.89% to 12.82% during the 4 year period (Table 1). Although prevalence declined in 1990, it increased thereafter, sometimes steeply. Chi square tests for trend for the 1989–1992 and 1989–1991 periods both yielded significant results (Table 1; and $\chi^2 = 12.25$; $P = 0.00047$, respectively). However, the steep 1992 increase in syphilis was not associated with an increase in HIV. As with HIV, the chi square test for trends for age specific syphilis revealed no significant result.

Figure 1 displays the trends of HIV and syphilis across 4 years. They have similar patterns with the exception of 1992 in which syphilis increased and HIV decreased. Despite the similarities, in the 2082 samples only one woman was positive for both HIV and syphilis. Analysis of these aggregate data revealed no relationship between HIV and syphilis (OR = 0.66, CI: 0.03–4.63). Therefore, this study provides no evidence linking the two infections. Further, and more importantly, it reveals no increase in HIV prevalence among traditional Maasai living in a high transmission area.

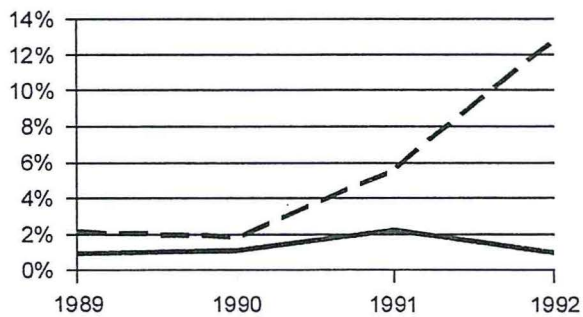

Figure 1. HIV and syphilis prevalance trends among traditional Maasai, Kajiado District, Kenya (1989–1992). — HIV positive prevalence; — — Venereal Disease Research Laboratory positive prevalence

DISCUSSION

Results from this study reveal low HIV seroprevalence with no increasing trend among traditional Maasai pasturalists in rural Kajiado District during 1989–1992. A slight increase in 1991 was not maintained in 1992. A longitudinal study of pregnant mothers in Nairobi, Kenya during 1989–1991 revealed increasing HIV prevalence of 16%, 17% and 17.2% respectively[8]. Another study in Nairobi at two time points revealed prevalences of 6.5% in 1989 and 13.0% in 1991[6]. Although data are scant, the increasing prevalence of HIV in urban areas is not evident among the traditional rural people included in this study.

Although HIV has penetrated the Maasai community, the current prevalence (0.95%–2.23%) is low when compared to urban populations throughout Kenya which ranged between 3.1% and 30%[6–8,10,11,13]. It is also low when compared to the 2.2% and 4.5% found in other rural sub-Saharan populations[5,7]. These results are similar to a study carried out among 306 Maasai women in northern Tanzania in which HIV seroprevalence was 1%[14,19]. This area is near to Kajiado District.

Another explanation for the continuously low HIV seroprevalence among antenatal attenders is the potential error arising from the possible link between HIV and infertility[20]. If such were the case, HIV seroprevalence

among a general, sexually active Maasai population would be higher. Another possible explanation for the low HIV seroprevalence is that pregnant Maasai women most at risk to HIV infection did not attend antenatal clinics. Both conditions would result in a lower estimate of HIV in pregnant Maasai women.

The trend of syphilis prevalence, however, was increasing. A longitudinal study in Nairobi, Kenya of pregnant mothers showed rates of 2.9% in 1989 and 5.3% in 1991 which is similar to prevalences found in this study of Maasai women[6]. The results of this paper, therefore, tend to be in agreement with urban studies which indicate an increasing prevalence of venereal syphilis during the same time period[9]. However, the steep increase in syphilis prevalence during 1992 from 5.60% to 12.82% is difficult to explain. It may be due to the fact that the Nomadic Health Unit changed their route in 1992, establishing bases closer to market towns in that year, thereby increasing the opportunity for infection. The NHU moved closer to market towns because in 1992 they found it difficult to find the same numbers of clients they had previously found in remote areas. If this explanation is accurate, it may imply that HIV is still low in the market towns situated away from the truck stops.

The probable reason that syphilis prevalence in Maasailand is similar to urban Kenya is that the bacterium has been present in Kenya for many years and has had sufficient time to establish itself in most communities. HIV has probably been introduced more recently into traditional communities, although in Kajiado District it is highly prevalent at truck stops. The probable reason that the comparative prevalence in Maasailand is low relative to urban Kenya is that the virus has not been effectively transmitted into traditional communities. A possible reason for these lower HIV prevalences is that traditional Maasai limit their sexual contact to partners within their own community. This strategy has the effect of limiting the entry of HIV into the community. Data suggest that maintenance of this traditional lifestyle may be protective. However, given the association of HIV with other STDs[21–23] and the current high syphilis prevalence in Maasailand, STD treatment programmes should be undertaken to curb the spread of the HIV infection in Maasailand. Although HIV prevalence is low at the moment, the current high syphilis prevalence suggests that HIV prevalence could increase if STDs are not controlled. This recommendation would only be viable, however, if traditional Maasai maintain their current lifestyles limiting sexual contacts to people living within their own communities. The caveat in this recommendation is that Maasai and Samburu men in Kenya tend to have high numbers of sexual partners[15]. Multiple partners in a population with high STD prevalences could promote the spread of HIV. At this point in time, this has not happened. Health promotion programmes working in traditional areas should consider incorporating into their programmes both the active detection and treatment of STDs, and the promotion and maintenance of traditional lifestyles. While doing this, however, they should also communicate the importance of embracing low-risk behaviours.

ACKNOWLEDGEMENTS

We express our debt to colleagues who not longer work at AMREF and whose present locations are not known. All reagents and laboratory facilities for this study were supplied by the AMREF Clinical Department directed by Dr Philip Rees. The laboratory was managed by Dr Jane Carter and Charles Otieno who trained P Mores Loolpapit, Ambrose Nyangao, and Francis Dikir as laboratory technicians. Dr Basil King, Head of the AMREF Nomadic Health Unit and Principal Investigator, processed the proposal through ethical and scientific clearance with the Government of Kenya and the Office of the President of Kenya. Prior to the study he managed the maintenance of blood specimens from the time they were collected until stored in the laboratory: this study would not have been possible without this early contribution. During the time of this study Dr Joseph Valadez was the Director of Evaluation and Research for AMREF and was responsible for design of the protocol and the analysis.

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