OPINION

WHY IS HIV PREVALENCE SO SEVERE IN SOUTHERN AFRICA?

The role of multiple concurrent partnerships and lack of male circumcision: Implications for AIDS prevention

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A 'Think Tank' meeting on AIDS prevention in the high HIV prevalence countries in southern Africa, convened in Lesotho in May 2006 by SADC and UNAIDS, concluded that 'high levels of multiple and concurrent sexual partnerships by men and women with insufficient consistent, correct condom use, combined with low levels of male circumcision are the key drivers of the epidemic in the sub-region.'[1] The top two 'key priority interventions' recommended by the HIV-AIDS, reproductive health, epidemiological and other experts participating in the Think Tank meeting were: (*i*) 'Significantly reduce multiple and concurrent partnerships for both men and women', and (*ii*) 'Prepare for the potential national roll out of male circumcision ... depending on the outcome of the [now successfully completed] Kenya and Uganda randomized trials'. Various other factors in the region's HIV epidemic, including a range of gender issues, especially the need for greater male involvement in HIV prevention, high prevalence of sexual violence, low HIV risk perception, and pervasiveness of transactional sex among young people, especially young women, were also discussed, and continued promotion of primary abstinence, greater access to HIV counselling and testing and access to condoms, especially in high-risk situations, were also recommended. This paper, however, focuses on the evidence underlying the Prevention Think Tank Meeting's two main conclusions.

The highly generalised HIV epidemic in southern and parts of east Africa is uniquely severe. Elsewhere, HIV transmission continues to be strongly associated with especially high-risk activities, namely use of injectable drugs, male-to-male anal sex, and sex work, and the most effective means of prevention are now generally recognised.[2] Although HIV has been present for nearly two decades in much of Asia, Latin America and eastern Europe, extensive heterosexual spread has seldom occurred in those regions.[3-6] While there is concern over the possibility that it could still occur, for the foreseeable future southern Africa will certainly remain by far the most severely affected region of the global pandemic.[6-9]

Although there has been some decline in HIV in parts of eastern Africa, rates remain extremely high in much of southern Africa.[2,7-9] The overwhelming burden of HIV is still concentrated in this region, home to less than 2% of the global population but at least one-third of all HIV-infected people. Infection rates among adults in South Africa, Swaziland, Botswana and western Kenya range from 20% to at least 30%, roughly an order of magnitude higher than anywhere else in the world, outside of Africa.[2]

What might account for this pervasive discrepancy? The now conclusive body of epidemiological and biological evidence confirming the strong association between lack of male circumcision and HIV[10-15] is increasingly understood to explain much of the roughly fivefold difference in HIV rates between southern and western Africa[7,16] (Fig. 1). In 2005, a randomised clinical trial of male circumcision for HIV prevention in Orange Farm, South Africa, found that the procedure reduced a man's risk of infection by at least 60%, and two similar clinical studies in Kenya and Uganda were recently halted prematurely, also due to such robust findings.[17-19] However, this key driver does not explain why HIV has spread so much more extensively in southern Africa than in India or in Europe, where circumcision is similarly uncommon. Although sexual cultures do vary from region to region,[20] these differences have not been studied in sufficient depth and their significance is not so obvious. For example, Demographic and

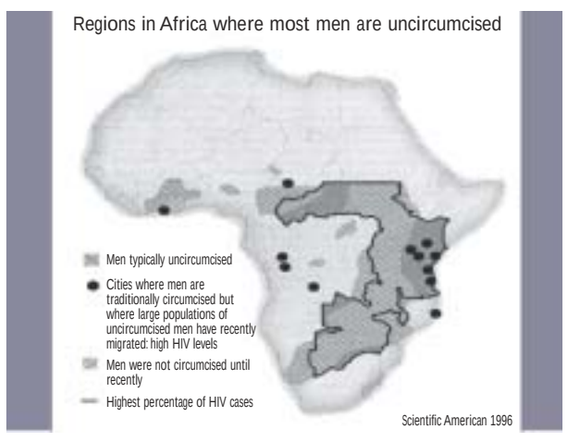


Fig. 1. Male circumcision and HIV in Africa.

Health Surveys and other studies suggest that, on average, African men typically do not have more sexual partners than men elsewhere.[21] A comparative study of sexual behaviour, conducted by the World Health Organization (WHO) in the 1990s, found that men in Thailand and Rio de Janeiro were more likely to report five or more casual sexual partners in the previous year than were men in Tanzania, Kenya, Lesotho, or Zambia. And very few women in any of these countries reported five or more partners a year.[22,23] Men and women in Africa report roughly similar, if not fewer, numbers of lifetime partners than do heterosexuals in many Western countries.[21,24-26]

Of increasing interest to epidemiologists is the observation that in Africa men and women often have more than one – typically two or perhaps three – concurrent partnerships that can overlap for months or years. For example, according to the WHO study, 18%, 22% and 55% of men in Tanzania, Lusaka (Zambia) and Lesotho, respectively, reported having two or more *regular*, ongoing (lasting at least a year) sexual partnerships in the previous year, compared with only 3% and 2% of men in Thailand and Sri Lanka. Among women, 9%, 11% and 39% in Tanzania, Lusaka and Lesotho reported two or more regular partnerships in the previous year, compared with just 0.2% and 1% of women in Thailand and Sri Lanka[22,23] (Fig. 2). This pattern of concurrent partnerships differs markedly from that of the pattern of serial monogamy more common in the West – i.e. the tendency to have one relatively long-term (a few months or longer) partner after another – or the more 'one-off' casual and commercial sexual encounters that occur everywhere.[23,27,28]

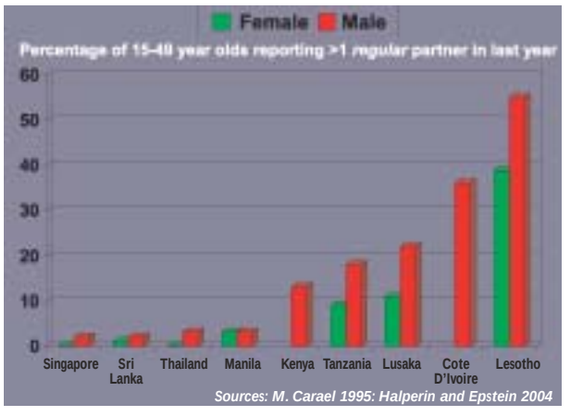


Fig. 2. Concurrent partnerships globally.

Morris and Kretzschmar used mathematical modelling to compare the spread of HIV in two populations, one in which serial monogamy was the norm and one in which long-term concurrency was common.[28] Although the total number of sexual relationships was similar in both populations, HIV transmission was much more rapid with long-term concurrency – and the resulting epidemic was some 10 times greater. The effect that Morris and Kretzschmar measured was due to the impact of sexual networking alone; they assumed that the infectiousness of HIV did not vary over time. However, it is now established that viral load, and thus infectivity,[15] is much higher during the 'acute infection' window period (typically about 3 weeks long) initially following HIV infection.[27,29,30] The combined effects of sexual networking and the acute infection spike in viral load means that as soon as one person in a network of concurrent relationships contracts HIV, everyone else in the network is placed at risk. In Lesotho, for example, according to a national Reproductive Health Survey conducted in 2002, 20% of men and nearly 10% of women reported having two or more partners during the past 4 weeks[31] (Fig. 3). And in the 2005 national, population-based 'Nelson Mandela' serosurvey in South Africa, among youth aged 15 - 24 about 40% of males and almost 25% of females reported having more than one current sexual partner. In contrast to this pattern of concurrent partnerships, serial monogamy traps the virus within a single relationship for months or years, so when a new partner is engaged the acute infection period of unusually high HIV infectivity has usually passed.

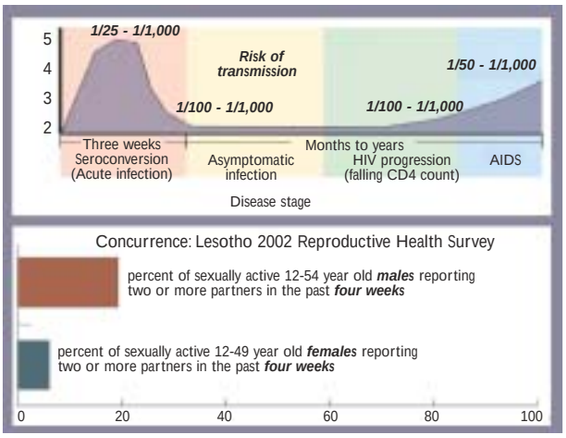


Fig. 3. 'Acute infection' and concurrence.

Morris subsequently studied sexual networks in Uganda, Thailand, and the USA.[28] She found that Ugandan men reported fewer lifetime sexual partners than Thai men, but while the Thais mainly had one-off encounters with sex workers, the Ugandan men's relationships tended to be of much longer duration. Given that the per-act probability of heterosexual HIV transmission is, on average, very low,[15] the much higher number of cumulative sexual acts – and hence the likelihood of transmission – within any given relationship was much greater in Uganda than in Thailand or the USA. In addition, except for sex workers, very few Asian women have concurrent partners, whereas a larger proportion of African women do. Even though the Ugandan women in Morris's study reported fewer concurrent relationships than Ugandan men, the multiple partnerships that some of them did have helped importantly to maintain the extensive interlocking sexual networks which facilitate the generalised spread of HIV.[23,28]

Although most African women in concurrent partnerships are not sex workers, such relationships often include a powerful element of sexual-economic exchange, related to issues of gender and income inequality, sexual culture, poverty, and the globalisation of consumerism.[32,33] A recent study from Malawi found that among some 1 000 adult villagers, whose sexual

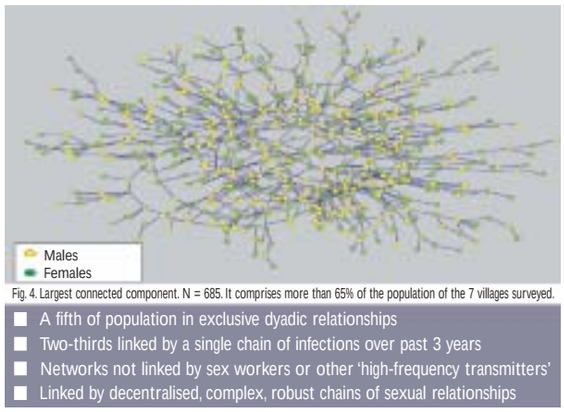


Fig. 4. Largest connected component. N = 685. It comprises more than 65% of the population of the 7 villages surveyed.

- A fifth of population in exclusive dyadic relationships
- Two-thirds linked by a single chain of infections over past 3 years
- Networks not linked by sex workers or other 'high-frequency transmitters'
- Linked by decentralised, complex, robust chains of sexual relationships

Fig. 4. Sexual networking in Likoma, Malawi.

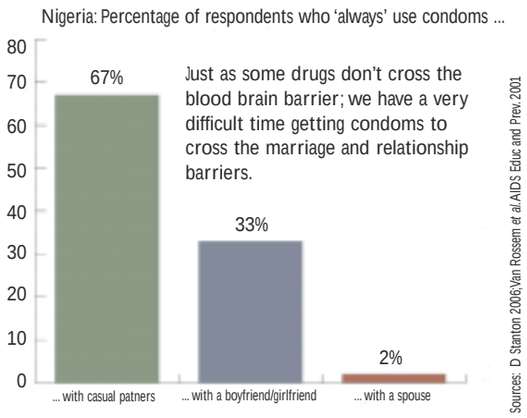


Fig. 5. Condom use in longer versus shorter-term relationships.

relationships were carefully mapped by researchers over a 2-year period, some 65% were 'connected up' in the same sexual network[34] (Fig. 4). Unfortunately the investigators did not inquire whether the sexual relationships were of a concurrent or serial nature, although data from similar populations in southern Africa suggest the likelihood that concurrency also plays a key role in that Malawi population.[1,2]

Although polygamy, and therefore a type of concurrency, is common in much of north and west Africa, as well as in other Muslim regions of the world, HIV infection rates tend to be considerably lower there. The most likely explanation is twofold: first, in most of west Africa and in all Muslim countries, nearly all men are circumcised.[5,6,9,13] Secondly, large-scale heterosexual concurrency networks can only emerge if a significant proportion of women are also engaging in multiple, longer-term relationships. But in Muslim societies generally, women's sexual behaviour tends to be under strict surveillance, which limits the extent of sexual networks.

Such differing patterns of sexual behaviour and the resulting differences in sexual networks have important implications for HIV prevention programmes and outcomes. Consistent use of condoms has been effectively promoted in Asia's organised brothels, most notably in Thailand and Cambodia, as well as, for example, in the Sonagachi project in Calcutta,[35] and among sex workers in the Dominican Republic, Abidjan, Senegal, Harare and elsewhere.[36-38] Yet, from the gay communities of Australia and San Francisco to the market towns of Uganda, it has proved much more challenging for people in ongoing longer-term relationships to consistently use condoms[37-43] (Fig. 5). In southern Africa – unlike in most of Asia or Latin America – such longer-term relationships are typically the ones in which HIV transmission takes place. For years, condom promotion has been a mainstay of donor-funded HIV prevention in Africa, yet a comprehensive review commissioned by UNAIDS concluded that, although condoms are highly effective when used correctly and consistently, 'no clear examples have emerged yet of a country that has turned back a generalized epidemic primarily by means of condom promotion.'[37]

Furthermore, a large experts' meeting convened by WHO in July 2006 concluded that, although treatment of sexually transmitted (bacterial) diseases continues to be an important public health measure, the impact on preventing HIV transmission, especially in high HIV prevalence, more generalised epidemics, is likely to be fairly minimal[31] (WHO Report forthcoming). And perhaps even more sobering, several meta-analyses and other rigorous reviews of the data on the impact of HIV testing and counselling on preventing HIV infection, particularly in Africa, so far tend to similarly suggest the likelihood of limited impact (especially for individuals who test HIV negative), although access to testing is clearly very important for various other reasons, including as an entry point for care and treatment.[44-46]

Thus while condoms (and STI treatment and HIV testing) remain important interventions, there is considerable evidence that people worldwide are more likely to use condoms during commercial and casual sexual encounters than in longer-term relationships, in which there is a sense of commitment and trust.[1,37-40,42,43] Also, because HIV can spread so efficiently through populations in which concurrent partnerships are common, everyone's risk is thereby increased, including persons who are commencing a sexual relationship, those who are monogamous with a partner who is not, or people who practise 'serial monogamy'. It is hoped that wider understanding of the dangers of longer-term concurrency could lead to a shift in social norms emerging from a deeper appreciation of the importance of avoiding and addressing concurrency, not only for those whose behaviour is 'risky' according to conventional standards, but also for those whose behaviour is not considered risky, such as monogamous women.

Although clearly no simple solution exists to this complex problem, it appears imperative that in addition to condom availability and other prevention approaches in Africa, there needs to be franker discussion and concerted public-health efforts addressing the dangers of having more than one longer-term sexual partner at a time, or of having a partner who has more than one longer-term partner. Because most Africans do not have high numbers of partners, they may not realise the special dangers of having long-term concurrent partners, especially in regions of high HIV prevalence. In much of southern Africa, even people with only two lifetime partners – hardly high-risk behaviour by Western standards – need to appreciate just how risky that one extra partner can be, for themselves and others, if the relationships are long-term and concurrent.

At a SADC/UNAIDS-organised regional consultation on social change communication for HIV prevention, held in Swaziland in October 2006, it was concluded that the focus of communications programmes across the region over the next 5 years should be on partner limitation.[47] Because in many African countries cultural practices and traditional policies allow and sometimes even encourage multiple partnerships for men, communications programmers will need to work closely with local leaders in order to get the messages right.

In addition, it was agreed that expanded and improved male circumcision services will need to be placed within a broader framework of male reproductive and sexual health.[1,47] Future communications programming will also need to emphasise that while male circumcision is protective, it certainly is not fully protective. Therefore messages which combine information about male circumcision along with promotion of partner limitation and consistent condom use will be essential.

It may seem simplistic to expect people to change their sexual behaviour, once they learn how dangerous it is to have multiple concurrent partnerships in areas of high HIV prevalence. There are, after all, numerous social, cultural and economic reasons why multiple concurrent partnerships exist. In many societies, having multiple partners is a powerful signifier of masculinity, and a relatively wealthy man may even be expected to have more than one wife or girlfriend as long as he can afford to do so.[48] It is also the case that many women in Africa – especially poor women – may be compelled to rely on multiple partners for support, and often have little power to negotiate with their partners about the timing of sex, use of condoms, etc. A detailed exploration of sexual culture in southern Africa is beyond the scope of this paper, but any HIV prevention strategy to address partner reduction and faithfulness should also take place within a wider campaign to address gender issues and to raise the status of women generally.[49]

Despite such important limitations, there is evidence that focused, clearly articulated partner reduction campaigns can make a difference, even in countries where traditional norms would seem to militate against behaviour change. The 'Zero Grazing' (partner reduction and faithfulness) campaign in Uganda,[31,33,37,39,50-53] coupled with evidence from other places such as Kenya and Addis Ababa,[54,55] suggests that fundamental society-wide changes in sexual norms and resulting declines in HIV rates can occur in Africa, just as they did in highly affected communities in north America and Europe in the 1980s.[56,57] Large surveys conducted in Uganda by WHO/the Global Programme on AIDS indicate that between 1989 and 1995 there was a 60% decline in the percentage of people reporting two or more sexual partners in the past 12 months.[41,50] The proportion of men reporting three or more partners fell even more dramatically[41,51] (Fig. 6).

These behavioural changes are believed to explain much of the decline in HIV *prevalence* that occurred during the 1990s, which modelling studies suggest was preceded by a steep decline in *incidence* – or the rate of new infections – during

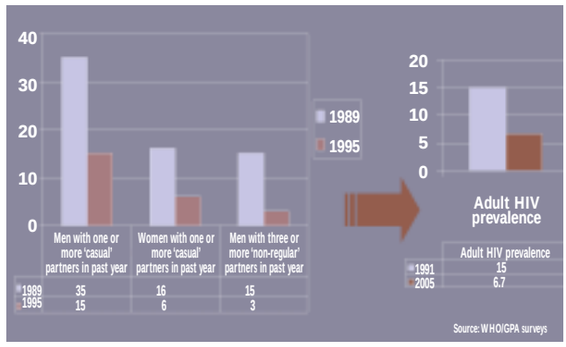


Fig. 6. Behavioural and HIV trends in Uganda.

the late 1980s, when the Zero Grazing campaigns were at their height.[8,50-53] A sampling of newspaper articles on HIV-AIDS in Kampala's main English language paper, *The New Vision,* between 1987 and 1992 found that of 20 articles in the period 1987-1989, 12 mainly addressed behaviour change (partner reduction-related issues in particular), whereas of 25 articles from 1990 to 1992, only 2 did so (although several in the latter period addressed issues such as increasing the condom supply). For example, a long piece on 'zero grazing' and other 'B' types of behaviour change, titled 'Slim [AIDS] is forcing people to change social habits', from 23 October 1987, contained this anecdote: 'In Bugolobi, a young housewife with three children declared, with a gleam in her eye, "My husband stays at home much more. And I encourage him to do so by enthusiastically keeping him informed of the latest gossip about Slim victims."'[51] An 11 November 1989 editorial in *The New Vision* concluded, 'AIDS has no cure. Protect yourself by zero-grazing.'

Recently, attention has been drawn to the reversal of the prevention success in Uganda, where there are some indications that HIV prevalence has increased.[2] This has been variously attributed to temporary shortages of condoms, or the expansion of abstinence-until-marriage programmes conducted by evangelical churches that may promote unrealistic standards of sexual behaviour.[58,59] However, the stagnant and worsening trends in Uganda date from about 2000, significantly before either the condom shortages or the proliferation of such abstinence-only programmes. Another possibility is that these negative HIV trends are due, at least in part, to the phasing out of the 'Zero Grazing' and other partner reduction/fidelity-focused campaigns of the late 1980s.[60-62] Indeed, Demographic and Health Surveys conducted between 1995 and 2005 suggest that there has been a considerable increase in the number of sexually active adults reporting multiple partners. The recognition that partner reduction has been neglected in Uganda's more recent prevention programmes, and that it must be a central theme of future campaigns, was emphasised in the final recommendations of a 3-day research symposium, organised by Makerere and Harvard universities, which was held in Kampala in December 2006.[63]

The Ugandan case is not unique. In Kenya, where HIV prevalence has also declined considerably, albeit more recently,[2] the percentage of men reporting two or more sexual

partners in the last year fell very sharply, according to Demographic and Health Surveys conducted between 1993 and 2003.[31,38] A study in rural Zimbabwe found an approximately 50% decrease in the percentage of men reporting a new sexual partner in the last month over a roughly 3-year period, coinciding with a significant decline in HIV prevalence and incidence[64] (Fig. 7). In Swaziland, where the government recently began aggressively promoting messages such as 'I Choose to Have Only One Sexual Partner' and 'Your Secret Lover Can Kill You', preliminary data from large surveys conducted in 2005 and 2006 found that after only 1 year, the percentage of adults reporting two or more partners in the last 4 weeks had fallen by approximately half.[65-67] This 4-week indicator roughly covers the 'acute infection' period, also approximately 3 - 4 weeks, and so may provide some measure of the degree of sexual networking in the population and the potential for highly efficient transmission of HIV.

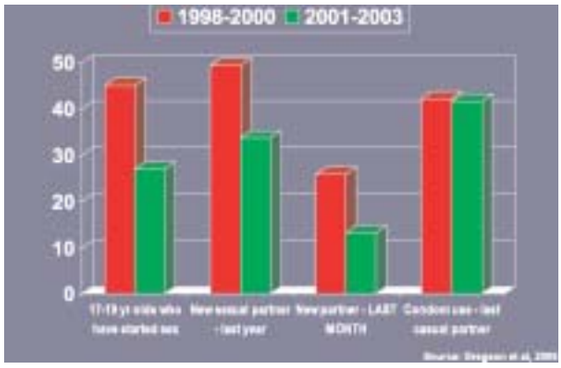
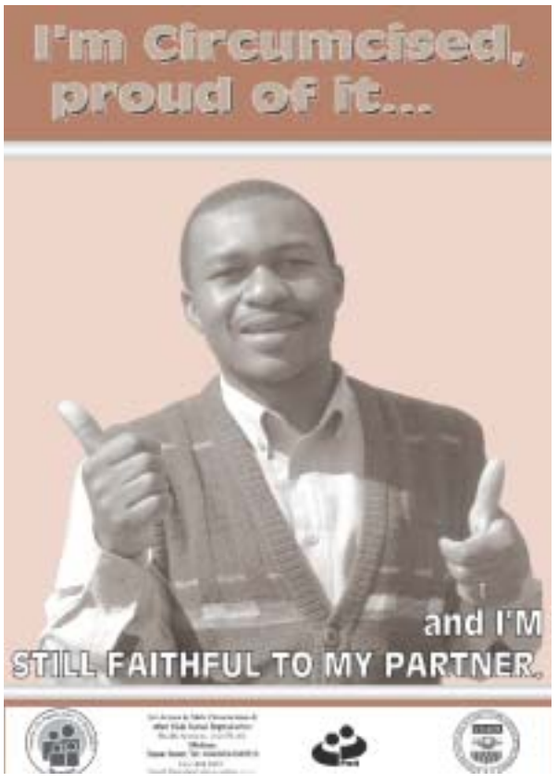


Fig. 7. Behaviour change among males in Manicaland, Zimbabwe.



In conclusion, although partner reduction/faithfulness approaches have received relatively little attention in most of Africa,[68,69] they appear to be feasible and epidemiologically crucial. The experiences of Uganda and some other places, where campaigns emphasising 'B' appear to have been associated with population-wide declines in HIV,[31,33,38,39,41,50-53] suggest there is empirical validity to the common-sense notion of emphasising partner limitation – in addition to other crucial approaches, such as the promotion of consistent condom use and increased access to safe and affordable voluntary male circumcision – for HIV prevention.[70,71]

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