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EDITORIAL

Preventing HIV in resource-limited settings: evidence for action, from cross-sectional surveys

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The current issue of the *International Journal of Epidemiology* features seven papers that cover a range of issues that are central to our understanding of the HIV epidemic and its control in resource-limited settings. One cross-sectional study highlights the importance of education as a protective factor against HIV in young South African women,[1] another illustrates the complex relationship between socioeconomic position and HIV infection in Tanzania,[2] and a further prevalence study examines the importance of lack of circumcision as a risk factor in the South Indian state of Andhra Pradesh.[3] Male circumcision is also the topic of a modelling study and an accompanying commentary, which examine the potential long-term impact of male circumcision on HIV prevalence in sub-Saharan Africa.[4,5] Another article in this issue systematically reviews the risk of HIV transmission from orogenital sex,[6] and the final piece estimates the HIV prevalence in Dehong Prefectrue of Yunnan Province China, which is close to the 'Golden Triangle' and has a serious HIV epidemic, fuelled by injection drug use.[7]

Almost three decades (and a Nobel prize) after the discovery of the virus, HIV/AIDS continues to be a massive burden in many resource-limited settings. Young people aged 15–24 years account for almost half of all new HIV infections in adults, and sub-Saharan Africa remains the region most heavily affected by HIV.[8] What can be done to stem the epidemic? Keep them in school, say Pettifor and colleagues,[1] based on a nationally representative sexual behaviour and HIV testing survey in South Africa, which showed that not completing high school was the most important risk factor for HIV infection in young women. The authors focused on women aged 15–24 years who reported to have only one life-time partner,[1] and therefore seemingly were at low risk of infection. The prevalence of HIV-1 infection was nevertheless high: 15.0% compared with 3.8% in men of the same age reporting one life-time partner.[9] Over three-quarters of women had not completed high school, and their HIV prevalence was 16.9% compared with 8.6% among the minority of women completing their education (crude odds ratio 2.15). The survey was cross-sectional and it is therefore unclear when women contracted HIV, before or after dropping out of school. Dropping out of school was clearly related to socio-demographic and behavioural factors, but unfortunately we are not told which of the variables included in the multivariable model were responsible for the substantial increase in the odds of infection associated with dropping out (adjusted odds ratio 3.75). The study of Pettifor and colleagues[1] supports the notion that social policies which keep young women in school will have many benefits, including the prevention of HIV infection. Interestingly, a randomized evaluation comparing three school-based HIV/AIDS interventions in Kenya recently showed that reducing the cost of education by paying for school uniforms, but not training teachers in HIV/AIDS education, reduced dropout rates, teen marriages and teen pregnancies.[10]

The importance of education is questioned by the data from the 2003/2004 Tanzania HIV/Aids Indicator Survey (THIS).[2] Mshisha and colleagues[2] focussed on sexually active adults and found that while education was not associated with HIV infection, there was a positive association between standard of living and HIV infection: in women, the prevalence of HIV infection increased from 2.7% in the lowest category of the household standard of living index to 14.1% in

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Photo 1 Kayamandi Secondary School is a Xhosa-medium school serving Grades 8–12 located in Kayamandi, Stellenbosch, in the Western Cape region of South Africa. As of 2006 the school had some 1493 students. Picture: www.flickr.com, copyright shared under Creative Commons licensing agreement

the highest category, with a similar gradient in being observed in men. While THIS was a major achievement (its results are documented in detail elsewhere[11]), it again was a cross-sectional survey, and this may well have affected this study more than the survey of girls and young women in South Africa. HIV prevalence in older adults of different socio-economic position (SEP) will be affected by participation rates, access to anti-retroviral treatment and survival, and does not necessarily reflect the risk of contracting HIV. Indeed, the final report of THIS[11] indicates that testing participation rates differed substantially according to SEP: the proportion of individuals refusing testing increased from 9.2% in the lowest wealth quintile to 20.6% in the highest quintile. This raises the question whether among the more affluent people, those at higher risk of HIV infection agreed to be tested, whereas low-risk people refused. Interestingly, in many parts of Africa, women of higher SEP were as likely to be infected with HIV as low-income, illiterate women in the first two decades of the HIV pandemic.[12] This appears to have changed in more recent years, with less literate women being at higher risk of infection compared with their better educated peers.[12,13] This could partly be explained by lower exposure to prevention programmes and other factors related to lower SEP, in particular increased vulnerability due to poverty.[12]

In the third of three population-based, cross-sectional studies Dandona and colleagues[3] identified several risk factors for HIV infection in adults living in Andhra Pradesh state in India, including low educational attainment and poverty. The prevalence of HIV infection overall was 1.7% in women and 2.1% in men. Taking into account the strength and prevalence of risk factors, the highest potential impact in terms of prevention was for male circumcision. The authors could now use the mathematical model presented by Londish and Murray[4] to further evaluate the long-term impact of male circumcision on HIV prevalence in their state and estimate the 'number needed to circumcise'—the number of surgeries needed to prevent one HIV infection over a period of, say, 10–20 years. As Gray and colleagues[5] argue in their commentary, the impact of circumcision will however, likely be greatest where HIV incidence is high and the prevalence of circumcision is low, for example in southern Africa.

Taken together, these studies illustrate the complexities of HIV prevention and serve as a reminder that cultural, religious and regional differences have to be taken into account when developing programmes. The combination of behavioural, structural and biomedical prevention adapted to local communities and based on scientific evidence are the most promising route to success in prevention.[12,14] Success will not come from a single intervention or a single study, but rather from multiple studies and gradual improvements by locally adapted prevention concepts and strategies as part of strengthening the overall national health systems and

services in low-income countries. Whatever is done, a special emphasis needs to be given to the most vulnerable: children, youth and women.

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