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Antiretroviral treatment is a behavioural intervention – but why?

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There have been rapid and dramatic increases in the numbers of people on antiretroviral treatment in Africa [1]. These numbers should continue to grow substantially if current treatment need is met and those progressing to later stages of infection are added into treatment programmes, especially if earlier initiation on treatment is adopted. Antiretroviral treatment itself may suppress HIV transmission rates by reducing viral load [2, 3] but its preventative effect in populations will depend on its impact on sexual behaviour, with increases in risky behaviour potentially negating the benefits of reduced transmissibility and decreases in risky behaviour enhancing them. Indeed, a substantial part of the modelled impact of the ‘test and treat’ strategy promoted by the World Health Organisation was derived from an assumed change in risky behaviour [4]. The paper by Venkatesh and colleagues published in this issue of *AIDS* (ref) suggests that initiation on treatment could lead to substantial reductions in risk behaviour in urban and rural populations in South Africa, which, if they can be replicated when treatment is initiated earlier and can be sustained for long periods after patients have regained their full health, would provide dramatic prevention benefits. These findings are very encouraging, especially since the comparison group comprised infected individuals who had previously received testing and counselling and could, therefore, already have adopted safer behaviour [5]. However, before we conclude that treatment will enhance HIV prevention efforts by reducing risk behaviour, we should consider, first, whether such a big effect in ART patients is plausible – or is more likely to have resulted from methodological difficulties – and, second, what the influence of ART might be on the behaviour of susceptible and undiagnosed infected individuals.

The study by Venkatesh and colleagues has a prospective design (spanning periods up to and after ART initiation), a large representative sample (N=6263 of whom 37% initiated treatment) with regular follow-ups, collected data on both sexes in both urban and rural areas, and applied rigorous statistical methods. As in some previous studies in sub-Saharan Africa [6, 7], initiation on ART was associated with reductions in sexual activity, including reporting of unprotected sex and multiple sexual partnerships. However, the effect sizes in this study were particularly remarkable. The authors did not investigate the reasons for the reductions in risk behaviour in their setting and we wonder about the plausibility of such big effect sizes. Why would people who had been seriously ill (WHO stage 4 disease and/or CD4 < 200 cells/ul.) and are now returned to good health become less sexually active and have fewer partners? Counselling and condoms were provided to newly diagnosed individuals as well as to those initiated on treatment; if disclosure to partners or fear of infecting others increased adoption of safer behaviours why would this be different for those who know they are infected but are not yet treated? Methodological difficulties remain a concern: if interviewers were not blind to who was on treatment, interviewer bias could have

affected the results. We are told that interviewers were trained to avoid social desirability bias, but this is very difficult to achieve especially when interviews are conducted in a clinical setting. It must be possible, therefore, that participants on ART felt a greater need to conceal risky behaviour. Concern over validity would be much assuaged by a good explanation for the behaviour change. In addition, trials showing the impact of expanded treatment on HIV incidence in populations would be welcome.

In assessing the impact of ART on sexual transmission, it is important that we consider the right behaviours in the right people. The best indicator of risk is multiple partnerships so it is notable that this was the indicator which changed the most amongst individuals initiated on ART in the South Africa study. Nevertheless, in assessing the prevention impact, it is important to consider the behaviour of those started on treatment in the context of the wider population. An increase in the fraction of the population that is HIV-positive owing to longer survival of those infected, other things being equal, might be expected to lead to an increase in exposure amongst susceptible individuals. More importantly, the effects of widespread availability of ART on behaviour will extend beyond those who are on treatment. In Western countries, studies have found evidence of behavioural disinhibition in susceptible and undiagnosed individuals in the presence of ART scale-up which resulted in the resurgence of epidemics [8]. The behaviour of these individuals will be as important, if not more so, than that of those on treatment in determining the future course of HIV epidemics within sub-Saharan Africa.

The study by Venkatesh and colleagues is a valuable contribution to our understanding of the impact of ART initiation on sexual behaviour of infected individuals and suggests that this impact could be large. However, more evidence through monitoring and evaluation is required before we can safely assume expanded treatment access is successfully reducing HIV incidence. Elucidating the reasons for changes in behaviour observed and establishing whether these changes extend to those with early treatment initiation and are sustained over time would be important contributions. Equally important, studies on the effects of increases in the availability of ART must be extended to encompass the effects on risk behaviour amongst undiagnosed and uninfected individuals. In the meantime, close integration of prevention activities within expanded care activities should continue [9]. [888 words]

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