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Chapter 2

Achieving 90-90-90: A Focus on Sero-Discordant Couples

Jacqueline Mthembu, Gadija Khan and Thabile Manengela

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.78313

Abstract

The South African Department of Health adopted numerous strategies to manage the HIV epidemic. Recently, the global 90-90-90 HIV treatment strategy was adopted. This strategy hope to ensure that 90% of people living with HIV will know their status, 90% of those testing HIV positive will receive sustained antiretroviral therapy and 90% of those receiving antiretroviral therapy will reach and maintain viral suppression by 2020. With a focus on literature, policies and implementation interventions, this chapter aims to provide an overview on current strategies used to reach the 90-90-90 goals and discusses how these strategies can be strengthened among sero-discordant couples within the South African public health system.

Keywords: sero-discordance, couples-counselling and testing, safe conception, behavioural interventions, treatment and adherence, gender norms, sexual health rights

1. Introduction

The burden of HIV has long plagued Sub-Saharan Africa [1]. Since the start of the epidemic, three decades ago, the country has made significant progress in managing the disease [2]. Over the last 10 years South Africa has successfully implemented HIV prevention and treatment strategies, informed by empirical research. Despite the gains made, incidence continues to increase given several socio-behavioural factors associated with HIV transmission [3–5]. Additionally, with an estimated 469,000 new infections noted in 2012, an increase in sero-discordant relationships can be anticipated [4]. It is therefore imperative to strengthen

sero-discordant interventions as a response to managing the HIV epidemic among couples that goes beyond couple testing [6].

2. Definition and prevalence of sero-discordance globally, SADC and SA

In sub-Saharan Africa, sero-discordance is a critical factor for the transmission of HIV [7]. Sero-discordance, refers to couples with a mixed HIV status. In such relationships one partner has a known HIV positive status while his or her partner is HIV negative [8, 9]. Hence, for the purpose of this chapter, we define a sero-discordant couple as two individuals who are in a current sexual relationship in which both partners are aware of the other's HIV status. Some authors have argued that sero-discordant sexual relationships are high risk as HIV transmission is more likely to happen in longer-term relationships [10–12].

Despite the misconception that a greater proportion of men are likely to be the index partner, through a systematic review Eyawo et al. [13] established that nearly half (47%) of the index partners were women. This indicates that men and women are equally likely to be the index partner in sero-discordant couples in the sub-Saharan African region. These findings also speak to the prevention and marketing strategies that are meant to be gender balanced in heterosexual sero-discordant couples.

In regions with high HIV prevalence, proportions of sero-discordant intra-couple transmission range from 13.0 to 55% of new HIV infections [14]. For South Africa, the estimated proportion of sero-discordant couples is unclear, however, transmission among longer-term couples were estimated above 10.0% per year [15]. Thus the prevention of intra-couple HIV transmission may delay the progression of the epidemic. As such, sero-discordant couples are a key target population in the context of HIV prevention.

3. Policies and policy implementation

South Africa has been very vigilant in the fight against HIV. For the last 20 years policy adoption and implementation has been at the foreground of HIV management. This section provides an overview of policy strategies that guide HIV management and discuss how these strategies influence the well-being of sero-discordant couples.

Since the start of the new millennium, the management of HIV was spearheaded by comprehensive, multi-sectorial action orientated National Strategic Plans for HIV/AIDS and Sexually Transmitted Infections [15]. Over the last 18 years, many gains have been made in curbing the HIV epidemic. Initiated by the health ministry in 1999 the NSP 2000–2005, in partnership with governmental and non-governmental organisations, as well as, community- and faith-based organisations priority areas related to HIV management were identified. The outcome of this discussion produced four key focus areas.

These included a focus on:

- Prevention;
- Treatment, care and support;
- Research, monitoring, and surveillance;
- Human rights and access to justice.

In essence, the NSP 2000–2005 garnered immense progress in the fight against HIV, but aetiological differences regards the epidemic between the government and civil society posed numerous challenges that curbed the progress [15]. Informed by the successes and limitations of the NSP 2000–2005, in addition to, the progress of the disease and the gains made in terms of biomedical advances, the NSP 2007–2011 continued to focus on improving prevention; treatment, care and support; research, monitoring, and surveillance; human rights and access to justice. Some primary goals were attached to each of these key priority areas. In terms of prevention, the goal was to decrease new infections by 50% with a focus on the 15–24 age year group. Even though this goal was not attained, the mother-to-child transmission was significantly reduced [16]. The treatment focused goal aimed to facilitate access to the appropriate HIV treatment to 80% of PLHIV by the end of the 5 year period. With some challenges regarding implementation, monitoring and evaluation, the decrease in the general adult mortality rates could be accredited to the increase in treatment access [16]. The third and fourth priority areas were reportedly riddled with implementation barriers and therefore did not reach all its goals. It can therefore be established that the second NSP (2007–2011) made some gains in managing HIV, but much more needs to be done at the structural level to ensure greater success.

The NSP 2012–2016, introduced a comprehensive response, which included goals and targets, linked to treatment, prevention, human rights and TB. While many goals were achieved during the 2012–2016 period, gaps were also identified. For instance, notable declines were reported in terms of reducing new HIV and TB infections, but the goal to reduce new HIV infections and new TB infections by at least 50% has not been achieved. What has become evident is that reducing incidence and stabilising prevalence, will require the scale-up of HIV/TB prevention, testing, linkage to care and life-long adherence strategies, with a particular focus on high risk populations.

Two years prior to the end of the NSP 2012–2016 term, South Africa adopted the global 90-90-90 treatment strategy. With its focus on treatment, the strategy targets aims to facilitate the necessary processes so that 90% of people living with HIV can know their status, 90% of those who tested HIV positive can receive sustained antiretroviral therapy and that 90% of those receiving antiretroviral therapy reach and maintain viral suppression by 2020 (see **Figure 1**).

According to Bain et al. [17] the success of the strategy would "… result in 73% of people with HIV achieving viral suppression, a crucial step in ending the AIDS epidemic by 2030 "(p. 1). With this strategy in place, the South African National AIDS Council (SANAC) [18] recently

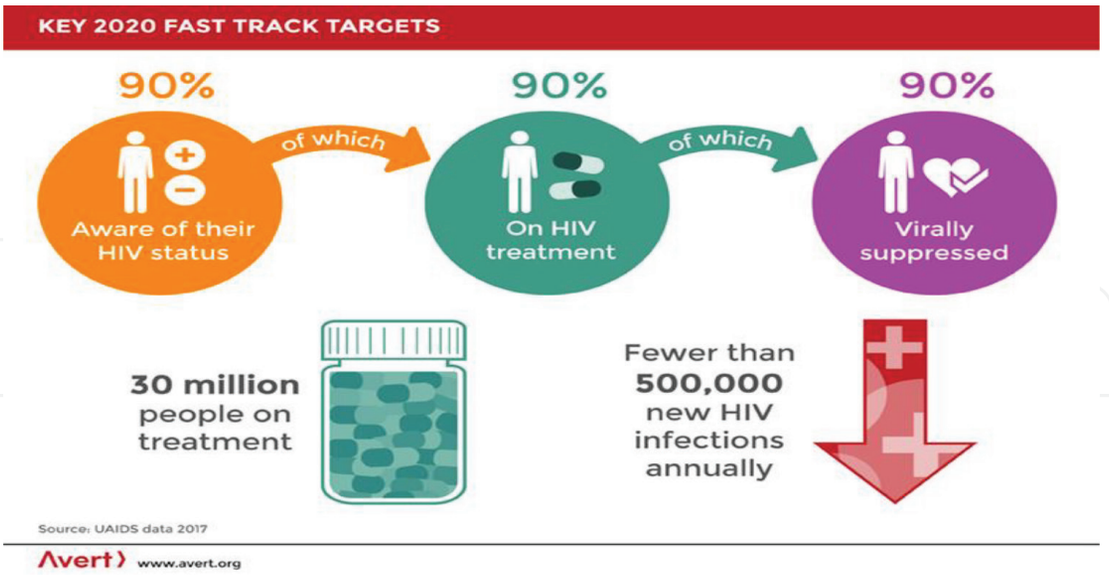

Figure 1. Key targets of the 90-90-90 HIV treatment strategy.

reported that among adults aged 15–59 years old, 86.0% were aware of their HIV status, of those 65.0% were currently on treatment, while of those who are on treatment 81% were virally suppressed (see **Figure 2**).

The current 2017–2022 NSP proposes a focus on social and behavioural aspects of HIV/AIDS and TB that prioritises a research agenda. This includes a commitment to having dedicated research funding for these health issues, build capacity to conduct research, and to identify better ways to collect and disseminate research findings. In addition, the plan acknowledges that we cannot simply treat our way out of the HIV epidemic, but that prevention strategies would offer the best response to curbing the HIV and TB epidemic.

While the NSP 2017–2022 stipulates the importance of Social Science and Humanities research in the 5 year plan, the proposed research foci continue to hover around understanding the

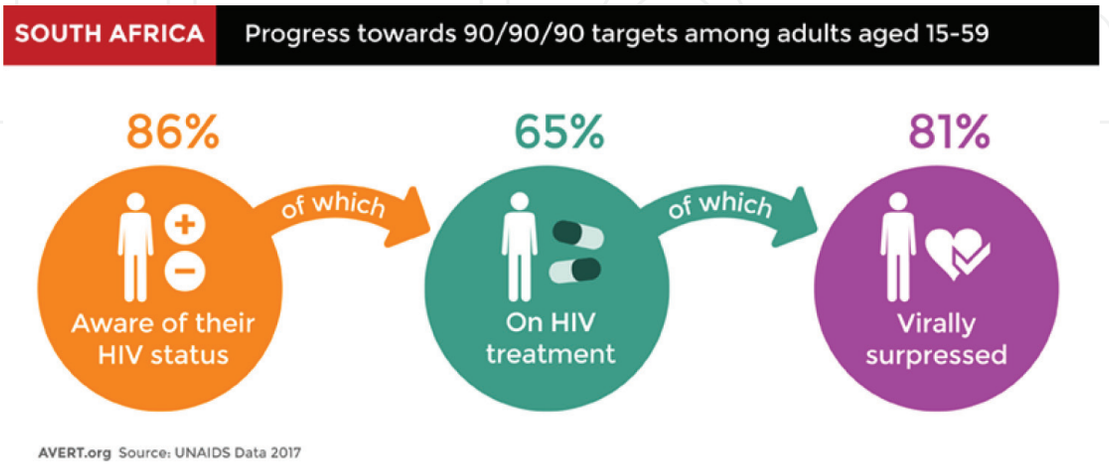

Figure 2. Progress towards the 90-90-90 HIV treatment strategy.

social determinants of HIV and TB. Because of the changing nature of the epidemics, research on social determinants will always be relevant. However, at this stage in the fight against HIV and TB, developing and testing robust behavioural intervention models should be at the foreground of our national HIV/TB response. Furthermore, what the current NSP lacks is a clear strategy that marries bio-medical and socio-behavioural models to improve the HIV/TB-related outcomes for the country.

For instance, with 6.8 mil PLHIV, more comprehensive work should be prioritised. An example of such work could include a socio-behavioural intervention among sero-discordant couples. The NSP highlights a focus on family, but fail to clearly define possible intervention entry points that could help achieve the 90-90-90 goals within the family. A family- or couple-focused intervention may include encouraging home-based testing, family participation in achieving adherence and ultimately viral suppression.

4. Existing prevention interventions for sero-discordant couples

This section provides an overview of existing prevention and intervention programmes, that are implemented in the public and private health care systems as well as those implemented by civil society organisations.

4.1. Current couple-centred HIV prevention services

The prevalence of sero-discordance among romantic relationships is growing in South Africa for various reasons [6]. What is concerning is the fact that, in the country and globally, it has been documented that HIV is most commonly transmitted between partners who are in a committed relationship [6]. This ultimately raises important issues including the risk of infection, reproductive choices and stress and change in the relationship dynamics. Despite the salience of couple relationships, existing HIV prevention interventions mainly focus on individuals instead of couples as a unit [19]. This negates the significant influence that couples play on each other's behaviour. There is growing agreement on the fact that prevention interventions and research should be aimed at couples as a unit to bring about change and maintain discordance. Couples-focused programs could concurrently include both dyad members, target each member separately and alone, in other instances might involve a combination of both modalities. The World Health Organisation has set out specific prevention interventions for couples with respect to their sero-status [20]. **Figure 3** lists the interventions that are specific for sero-discordant couples be it whether the male or female is the index partner.

4.1.1. Case identification through HIV testing services (HTS) for couples

Paying closer attention to literature pertaining to HIV Testing Services, couples counselling and testing are especially important for identifying HIV sero-discordant status among couples. Many men and women who are in relationships with a partner who is HIV positive do not know their own HIV status let alone their partner's [21]. In settings with a generalised HIV epidemic, research shows that in the context of sero-discordant relationships women

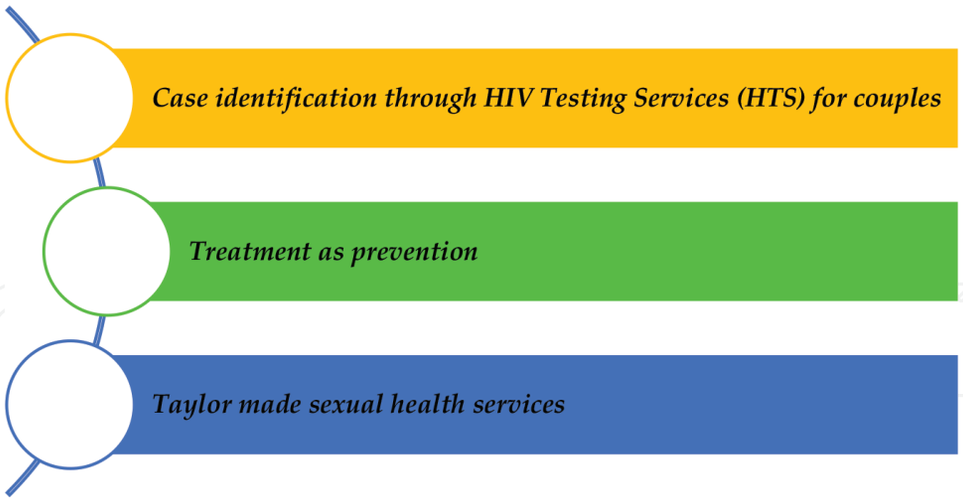

Figure 3. Prevention strategies to reduce the risk of HIV transmission for sero-discordant couples.

are especially more vulnerable to contracting the virus, due to their biological susceptibility as well as the infidelity of men [21]. A study conducted in a rural setting within South Africa, however found that HIV transmission was high among migrant men as well as migrant women returning to their partners. This finding suggest that there is a need to reconsider the premise that HIV transmission within stable relationships is attributed to extra marital sexual activity by men.

With this being said, HIV counselling and testing has mainly been individual based and sex-specific. In regard to individual based prevention strategies, Jones et al. [22] implemented a couples HIV risk reduction intervention (called Partner Project) that included HIV Counselling and Testing program in 6 urban community health clinics in Lusaka, Zambia. The researchers found that the use sexual barrier indicators was achieved among the intervention group. The results also showed that there was a reduction in intimate partner violence (IPV) for the entire sample. IPV commonly inhibits discussions among partners regarding HIV testing, sero-status disclosure and condom use. Hence there should be an essential component of HIV prevention services that also target the reduction of IPV.

4.1.2. Treatment as prevention

In the contexts of sero-discordant couples, two broad prevention strategies with ARVs can be considered. Namely: antiretroviral treatment (ART) for the HIV-positive partner and pre-exposure prophylaxis (PrEP) for the HIV-negative partner.

4.1.2.1. Antiretroviral treatment (ART) for the HIV-positive partner

The WHO HIV treatment guidelines [20, 23] recommend initiation of lifelong ART for individuals with a CD4 counts of 350/mm^3 or lower. More recently, the WHO guidelines in 2013 recommended ART for all patients regardless of their CD4 count. Furthermore, for those who are in relationships with an HIV negative partner, the discordant partner is also

recommended to initiate treatment [24]. The utilisation of ARV to prevent HIV transmission thus transformed the field of comprehensive care for couples, particularly when the existing foundation was primarily the promotion of condom use. In an analysis conducted by Lasry et al. [25] who assessed the plausibility of a combination of strategies to reduce risk among sero-discordant couples. They established that ART initiation was the most protective strategy employed. To demonstrate the effectiveness of the use of ARVs in reducing the risk of HIV transmission Hallal et al. [26] cites the Partners in Prevention project, among various other studies in their systemic review. The study was conducted across seven African countries namely Botswana, Kenya, Rwanda, South Africa, Tanzania, Uganda, and Zambia. The sample comprised of 3400 sero-discordant couples who were followed for a period of 24 months. A total of 349 (10.0%) started on HAART. The findings of the study showed that there was substantial (92.0%) reduction of HIV risk transmission through the utilisation of HAART [27]. An emerging trend is to employ strategies in combination with ART to expand the possibilities of interventions for sero-discordant couples [26]. In a rural setting in KwaZulu-Natal, South Africa, Oldenburg et al. [28] estimated the effect of ART in reducing the acquisition of HIV in sero-discordant couples in a HIV-hyperendemic and resource constrained setting. In the study, ART was delivered through primary care clinics that were primarily staffed and led by nurses. The researchers found that ART is highly effective in reducing HIV acquisition in sero-discordant couples, this is despite the constrained resources in the public health system.

4.1.2.2. Pre-exposure prophylaxis (PrEP) for the HIV-negative partner

A breakthrough for the extremely high infection rates in the SADC region is PrEP, where ARVs are administered to those individuals who are at risk of sexually acquiring the virus [29]. In the contexts of sero-discordant couples, PrEP is usually administered to the HIV-negative partner, before possible HIV exposure, which inadvertently reduces the risk of HIV acquisition [23]. In various forms PrEP has been tested (i.e. oral tablets, vaginal/rectal microbicides) or being developed as long-acting vaginal rings and intramuscular injectables [30]. In regard to oral PrEP, findings from the Partners PrEP Study showed that daily oral consumption of Tenofovir Disoproxil Fumarate/emtricitabine (TDF/FTC) reduced the acquisition of HIV-1 by 75.0% and HSV-2 by 33.0% in heterosexual sero-discordant couples from Uganda and Kenya [26, 31]. Two PrEP trials, namely the FemPrEP and Vaginal and Oral Interventions to Control the Epidemic (VOICE), were stopped prematurely due to the futility associated with poor adherence [29]. An active arm of the VOICE trial also established no prevention benefit for oral TDF/FTC owing to poor levels of adherence [29].

In regard to vaginal gels, the CAPRISA 004 study assessed the effectiveness and safety of 1.0% Tenofovir gel for the prevention of HIV infection in among 889 women (aged 18–40 years, who were sexually active with a sero negative status) from urban and rural KwaZulu-Natal [31, 32]. The researchers investigated the reduction of HIV incidence against varying degrees of adherence. The findings of the study demonstrated that HIV incidence reduction was 54.0% for high adherence (gel adherence >80%), the HIV incidence was 38.0% and 28.0% lower for intermediate adherence (gel adherence 50–80%) and low adherence (gel adherence <50%) respectively. Overall, the HIV infection was reduced with Tenofovir gel at an estimated 39.0%.

4.1.3. Tailor-made sexual health services

4.1.3.1. Voluntary medical male circumcision (VMMC) for HIV-negative male partners

VMMC has been recommended by PEPFAR and WHO, as an HIV prevention method to reduce the risk of HIV acquisition in generalised epidemics [30]. Evidence from South African, population-based data, demonstrates that there were lower HIV prevalence and incidence (55.0 and 65.0% lower, respectively) among circumcised men compared to uncircumcised men [29, 32]. Voluntary medical male circumcision is recommended, within heterosexual sero-discordant couples in the case where the male is the HIV-negative partner [31]. It is an excellent HIV prevention method, because it offers lifelong partial protection against female-to-male sexual transmission of HIV. However, it is not recommended for HIV-positive males within heterosexual relationships or men who have sex with men [31]. To help increase coverage of VMMC, WHO recommended that all HIV-negative men in sero-discordant or concordant negative couples be routinely counselled about and linked to VMMC services [30].

Several research confirming the protective effect of VMMC against HIV infection have been published [30, 31, 33–35]. Baeten et al. [35] conducted an observational study with 1096 African HIV-1 sero-discordant couples in which the index partner (HIV-1 seropositive partner) was male. The sample was drawn from 7 Southern African (Gaborone, Botswana; Cape Town, Orange Farm, and Soweto, South Africa; Kitwe, Lusaka, and Ndola, Zambia) and 7 eastern African Africa (Eldoret, Kisumu, Nairobi and Thika, Kenya; Kigali, Rwanda; Moshi, Tanzania; Kampala, Uganda) sites. The results showed a non-statistically significant decrease in the risk of HIV-1 transmission for circumcised HIV-1 infected men to their female partners in comparison to couples with uncircumcised HIV-1 infected men. This finding adds to a limited body of data relating circumcision status in HIV-1 infected men to the risk of male-to-female HIV-1 transmission, data which may be helpful for programmes working to scale-up male circumcision for HIV-1 prevention. Randomised trials from Kenya, South Africa, and Uganda demonstrated that male circumcision reduces a man's risk of acquiring HIV-1 by approximately 60.0%.

Auvert et al. [33] conducted an experimental trial to test the efficacy of Medical circumcision (MC) as a protecting factor against HIV infection among men. The study was the first randomised control trial, in South Africa, that aimed to test the impact of MC on health. The findings demonstrated MC offers a substantially high level of protection for men against acquiring HIV infection, this protection may be seen as effectiveness as what a vaccine of high efficacy would achieve [33]. Furthermore, Auvert et al. [34] continued to do research on medical male circumcision. They implemented the Bophelo Pele community-based HIV campaign (Orange Farm, South Africa). The campaign included the roll-out of free VMMC. A cross-sectional survey was administered with men aged 15–49 years. The results of the survey suggest that the roll-out of VMMC was associated with a reduction in the incidence and prevalence of HIV among circumcised men as compared to uncircumcised men. Furthermore, the findings also provide an argument that the uptake of VMMC is plausible and may become acceptable in communities that were traditionally non-circumcising communities in South Africa and sub-Saharan Africa [34].

4.1.3.2. Family planning

Many sero-discordant couples have high fertility and both (infected and uninfected) partners often report desires of having children with their partner [36]. Pregnancy is a time of heightened risk of sexual transmission and acquisition of HIV. Technologically advanced options for conception for sero-discordant couples include intrauterine or intravaginal insemination (of semen during the fertile period). Vaginal insemination is regarded as the safer method of conception to circumvent the sexual transmission of HIV [37]. However, it may not be accessible or affordable to all, especially in low to middle income countries [36, 39]. As such preconception services for PLHIV and their partners are prudent, and should be part and parcel of the care package they receive. The purpose of preconception care and counselling (PCC) for PLHIV is to ensure that both partners are optimally healthy, prior to pregnancy, and that the risk of HIV transmission to the partner (sexual transmission) and child (through pregnancy, delivery or breastfeeding) are reduced [38]. Options for safer conception, that are less reliant on technology, for sero-discordant couples include ART for the positive partner, timed unprotected intercourse, and PrEP for the uninfected male partner. ART literature shows that safe conception may be feasible when the infected partner is virally suppressed and on ART. While fully suppressive ART use may significantly reduce the chance of sexual transmission, sexual HIV transmission may still occur [36, 37]. Limited and timed unprotected sex and –natural conception for HIV sero-discordant couples involves limited and timed unprotected sexual intercourse during the fertile periods. Women are advised to track their menstrual and ovulation cycles. Couples are encouraged to minimise their sexual encounters to the fertile period to decrease the number of unprotected sexual encounters while maximising their chance of conception [35–37].

Periconception PrEP—is an option for the HIV negative partner. The benefits for the periconception PrEP is higher adherence and lower costs due to the shorter duration of utilisation. It is important to establish whether periconception PrEP regimen will help lower the risk of couples who have decided to conceive despite known risks of transmission to partner and baby. While there are no trials with a particular focus on the risk of HIV transmission among sero-discordant complies during conception, but data drawn from the safety and efficacy of PrEP in future clinical trials among heterosexuals couples and trials testing drugs for PMTCT can offer insights [36, 38, 39].

5. Barrier and facilitators to achieving 90-90-90 among sero-discordant couples

The possibility of sero-discordant relationships are becoming more common, given the improved quality of life and higher life expectancy for people living with HIV [26]. It is therefore imperative to expand HIV prevention efforts that target sero-discordant couples in the effort to reach the 90-90-90 treatment goals.

In regard to HIV testing and counselling, evidence shows that many of the prevention strategies to reduce the risk of HIV transmission in couples are individual as opposed to couples

based. HIV testing and counselling practices, thus far, have only included one partner and encouraged clients to invite their partners to test for HIV. It would be ideal to provide health care services and feasible prevention methods for couples as a unit as opposed to individuals. Furthermore, it is evident that services have been gendered to favour females (e.g. who receive antenatal care) who are perceived to be at greater risk and to whom routine testing is encouraged. It may be important to expand the scope of testing for HIV among men who access health facilities for other health services. It may be suggested that there be more emphasis placed on HIV testing among males and this may speak to a need for male-centred health facilities.

In relation to treatment as prevention for sero-discordance, it was found through various clinical trial in South Africa that adherence to using PrEP was a major barrier [29]. This therefore nullifies the excellence of the approach to safeguard the uninfected partner from the transmission of the virus. Furthermore, some of the pre-exposure prophylaxes technologies are yet to be tested. And therefore it is imperative that we explore strategies to increase adherence for ART for the positive partner, more importantly that we should uncover the barriers to adherence for PrEP utilisation.

There are barriers associated with family planning strategies for sero-discordant couples. These include the affordability and accessibility of intrauterine or intravaginal insemination technologies to aid in safe conception. Couples therefore have to rely on manual methods such as timed unprotected sex during fertile periods. This strategy requires health care workers and couples to be cautious and thorough in their actions, so as to reduce the risk of transmission.

Regardless of the existing literature on sero-discordant couples, there is still a need to conduct further research on treatment as prevention and sexual health services that are tailor-made for such couples.

Author details

Jacqueline Mthembu[1]*, Gadija Khan[1] and Thabile Manengela[2]

*Address all correspondence to: jmthembu@hsrc.ac.za

1 Human Sciences Research Council (HAST), Cape Town, South Africa

2 North West University, Mmabatho, South Africa

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