

Technologies for HIV prevention and care: challenges for health services

Tecnologias de Prevenção do HIV e desafios para os serviços de saúde

Ivia Maksud^I, Nilo Martinez Fernandes^{II}, Sandra Lucia Filgueiras^{III,IV}

ABSTRACT: This article aims to consider some relevant challenges to the provision of “new prevention technologies” in health services in a scenario where the “advances” in the global response to AIDS control are visible. We take as material for analysis the information currently available on the HIV post-exposure prophylaxis (PEP) and pre-exposure prophylaxis (PrEP), treatment as prevention (TASP) and over the counter. The methodology consisted of the survey and analysis of the Biblioteca Virtual em Saúde (BVS: MEDLINE, LILACS, WHOLIS, PAHO, SciELO) articles that addressed the issue of HIV prevention and care in the context of so-called new prevention technologies. The results of the studies show that there is assistance on the ground of clinics for the treatment of disease responses, but there are several challenges related to the sphere of prevention. The articles list some challenges regarding to management, organization of services and the attention given by health professionals to users. The current context shows evidence of the effectiveness of antiretroviral therapy in reducing the risk of HIV transmission, but the challenges for the provision of preventive technologies in health services permeate health professionals and users in their individual dimensions and health services in organizational and structural dimension. Interventions should be made available in a context of community mobilization; there should be no pressure on people to make HIV testing, antiretroviral treatment or for prevention. In the management is responsible for the training of health professionals to inform, clarify and make available to users, partners and family information about the new antiretroviral use strategies.

Keywords: HIV. Disease prevention. Post-Exposure Prophylaxis. Pre-Exposure Prophylaxis. Integrality in Health. Health services.

^IInstituto Fernandes Figueira, Fundação Oswaldo Cruz – Rio de Janeiro (RJ), Brazil.

^{II}Instituto de Pesquisa Clínica Evandro Chagas, Fundação Oswaldo Cruz – Rio de Janeiro (RJ), Brazil.

^{III}Health Department of Rio de Janeiro State – Rio de Janeiro (RJ), Brazil.

^{IV}Universidade Federal Fluminense – Niterói (RJ), Brazil.

Corresponding author: Ivia Maksud. Avenida Rui Barbosa, 716, 4º andar, Flamengo. CEP: 22250-020, Rio de Janeiro, RJ, Brasil. E-mail: ivia.maksud@iff.fiocruz.br

Conflict of interests: nothing to declare – **Financial support:** none.

Note: Ivia Maksud and Sandra Filgueiras were responsible for writing the section on the results concerning PEP; Nilo M. Fernandes wrote the sections on results related to PrEP, treatment as prevention and home testing. All authors were responsible for the analysis of data and for writing the introduction, discussion and conclusions.

RESUMO: Este artigo objetiva pensar desafios concernentes à oferta das “novas tecnologias de prevenção” nos serviços de saúde num cenário em que os “avanços” na resposta mundial para o controle da AIDS são visíveis. Tomamos como material de análise informações atualmente disponíveis sobre a profilaxia pós-exposição sexual (PEP) e pré-exposição sexual (PrEP), o tratamento como forma de prevenção (TCFP) e a autotestagem. A metodologia para elaboração do texto consistiu no levantamento e análise de artigos na Biblioteca Virtual em Saúde (BVS: MEDLINE, LILACS, WHOLIS, PAHO, SciELO) que abordassem o tema da prevenção do HIV no contexto das chamadas novas tecnologias de prevenção. A análise dos artigos elenca alguns desafios para a gestão, organização dos serviços e atenção dispensada pelos profissionais de saúde aos usuários. O contexto atual mostra evidências sobre a eficácia do tratamento na redução do risco da transmissão do HIV, mas os desafios para a oferta das tecnologias de prevenção nos serviços de saúde passam por profissionais de saúde e usuários em suas dimensões individuais e os serviços de saúde numa dimensão organizacional e estrutural. As intervenções devem ser disponibilizadas em um contexto de mobilização comunitária; não deve haver pressão sobre as pessoas para fazer o teste anti-HIV, tratamento ou antirretroviral como forma de prevenção. À gestão cabe o treinamento dos profissionais de saúde para informarem, esclarecerem e disponibilizarem a usuários, parceiros e familiares informações sobre as novas estratégias de utilização de antirretrovirais.

Palavras-chave: HIV. Prevenção de doenças. Profilaxia Pós-exposição. Profilaxia Pré-exposição. Integralidade em Saúde. Serviços de saúde.

INTRODUCTION

Health technologies are part of health care programs and can be considered as the “practical application of knowledge”: they include machinery, medical and surgical procedures, drugs, programs and systems dedicated to providing health care¹. Analyzing the incorporation of new technologies in health care, Trinidad shows that incorporation decisions involve the following:

- a) the context of use, indication, importance from an epidemiological point of view and currently recommended treatment;
- b) the new technology in question, its efficacy and safety;
- c) the costs of the new technology compared to the established alternatives, and, we stress;
- d) the actions and perceptions of the actors involved in the decision to incorporate the technology;
- e) the discussion on its possible impact¹.

In the field of HIV/AIDS, Chequer highlights the scarcity of global resources facing the research needs for the implementation of strategies already proven effective². For Francisco Bastos, the “huge gap between results of clinical trials and the real world is permeated by economic, social and gender inequalities, by stigma and discrimination, lack of political will, the mismanagement of resources and their scarcity and the lack of preparation and sensitivity of health professionals in dealing with marginalized populations”³. At the same time, Pereira Junior believes that technology can benefit large contingents of the population, as long as the pattern of prevailing socio-political relations changes⁴. However, Sheffer remembers that technological advances applied to medicine are lacking in research involving human

beings, and that often economic interests may be involved in the conduction of experiments and clinical trials, which poses the challenge of thinking about the issue within the framework of ethical standards in force⁵.

According to Ayres, for the improvement of prevention actions, we need to transcend the ideas of risk group and risky behavior — concepts that “label, generalize, decontextualize and depoliticize” — and he includes, as a reference to these practices, the understanding of vulnerabilities and, considering human rights, the ways to fight against them, as well as damage reduction as a guiding attitude of prevention practices⁶. For the World Health Organization (WHO), evidence that less than half of the people living with HIV do not know their diagnosis and that, in some places, the test is still seen with discrimination by some populations indicate that these barriers to broaden the scope of treatment and its use for prevention must be overcome. Accordingly, it has stated that safe and effective strategies for HIV prevention for vulnerable subpopulations are fundamental⁷.

The reality of health policy planners require of them sometimes immediate and effective answers. Today, the possibilities of prevention include, in addition to condom use, other strategies to reduce HIV transmission. Among these, WHO proposes: offering counseling for serodiscordant couples; treatment as prevention (TasP) for the seropositive partner, a strategy that can significantly reduce the risk of HIV transmission to the seronegative partner; the use of antiretroviral drugs in sexual post-exposure (PEP) and sexual pre-exposure prophylaxis (PrEP) for populations that are more vulnerable to HIV: men who have sex with men (MSM), transgender women, transvestites, sex workers and injectable drug users⁷. The Centers for Disease Control and Prevention (CDC) approved HIV self-testing as a safe way to expand HIV diagnosis⁸. As the Brazilian Ministry of Health highlights: “The field of prevention and the latest biomedical approaches consider that combined prevention strategies are more effective and allow the opportunity to provide the means for structural and individual interventions”⁹.

This article aims to consider relevant challenges to the provision of “new prevention technologies” in health services, in a scenario in which the “advances” in the global response to AIDS control are visible.

METHODS

The methodology for this article consisted of the survey and analysis of articles that addressed the HIV prevention issue in the context of the so-called new prevention technologies. The survey of articles was carried out on the Virtual Health Library (VHL) — in the MEDLINE, LILACS, WHOLIS, PAHO and SciELO databases — comprising the period from 2009 to 2014. For the topic of PEP, a search was made in VHL using the terms HIV and PEP, which resulted in 95 references. From these, were excluded all items that did not address the dimensions of the analysis, as well as articles that addressed PEP for occupational

accidents and sexual violence, resulting in 24 references. For the topic of PrEP, the keywords HIV and PrEP were combined, resulting in 297 references. Of these, only 22 articles discussed the deployment of technology in health care, of which nine were selected. For the topic of antiretroviral treatment as prevention, the descriptor itself was used, as well as its abbreviation, TasP. For the first survey, 61 results were found, of which only 7 were related to the topic searched. With the keyword TasP, 126 references found, and only 1 was related to the subject. For the topic of self-testing, the keyword itself was used. Only one reference related to the topic was found. The descriptor over the counter showed 270 results, only two related to the topic. An auxiliary search was made from the keywords HIV and new technologies, resulting in four articles. Conference abstracts and research reports available on the subject were also added.

The results were discussed from the theoretical framework of public health, reflecting on the challenges of deploying these new technologies for HIV prevention in health care, from the perspectives of care and integrality.

RESULTS

SEXUAL POST-EXPOSURE PROPHYLAXIS

Sexual PEP is a prevention technology that consists in the use of antiretroviral (ARV) for 28 days, starting within 72 hours after the possible sexual exposure to HIV. It is available as a strategy for HIV prevention since 1998. First widely used in occupational accidents and, from the 2000s on, with victims of sexual abuse, this strategy has to be employed in situations where the condom fails, breaks or is not used in sexual relationships with people infected or more likely to be infected with HIV.

A systematic review carried out in 2009 indicates that studies on the cost-effectiveness of sexual PEP have many limitations (e.g. lack of published data on clinical efficacy after exposure). This review shows that sexual PEP has been demanded by men who have unprotected receptive anal sex with men, when the source partner is known to be HIV-positive or not, heterosexuals after unprotected receptive anal sex (women), and injectable drug users sharing needles with people known to be HIV-positive. In this review, the analysis of cost-effectiveness suggested that sexual PEP is profitable for all sexual relationships between men (receptive and insertive unprotected anal sex, unprotected receptive oral sex) and possibly is cost-effective for injectable drug users and high-risk women¹⁰.

In the city of San Francisco (USA), one clinic maintains a PEP program since 2002. The lessons learned from this experience show that the lack of knowledge on the strategy among potential users and health professionals, as well as limited availability of technology services, contribute to its underutilization. The experience of use is highly personalized and unique to each individual, and the perception of risk is therefore variable. In this study,

one third of users had not been under an exposure that matched all of the criteria to justify this intervention. Just as patients differ with respect to risk perception, health professionals also may differ in counseling messages related to this strategy¹¹. A negative factor for the success of the therapy would be the high rate of noncompliance, and studies suggest that counseling could reverse that rate^{12,13}. But there is significant evidence that the intervention of health professionals is associated with increased adherence¹¹.

“Sexual PEP” is available in public health services in Brazil since 2010. According to the Ministry of Health, it is indicated for exceptional situations where condom failure and breakage occurs, being guided by the context of recognition of sexual rights, and is a prevention strategy aimed at vulnerable populations. This strategy has the potential to attract the population who do not seek care for other reasons to the health network, and therefore is an opportunity to link these people to health services (by allowing, for example, access to person’s and their partner’s diagnosis). On the Prevention Congress held in September 2012, the experiences with the implementation of PEP in São Paulo State and in the city of Belo Horizonte, Minas Gerais, were disclosed. At the time, there was an agreement on the part of AIDS program managers on the need to expand the range of HIV prevention alternatives, considering the non-use of condom by a significant part of the population. Being a recent experience, the states and municipalities showed difficulty in the implementation of this strategy in Brazil, including the difficulty with the organization of work processes for the inclusion of this new approach in the routine of health professionals in emergency rooms and HIV clinics, as recommended by the Ministry of Health, and the resistance by health professionals to broaden the dissemination of a prevention strategy that could be seen as an incitement to not using condoms¹⁴. In Belo Horizonte the user profile shows that males and heterosexuals, with unknown partner serology, have a greater tendency of use. A large index of non-return to the service has been observed in the city, demonstrating the difficulty in adhesion and commitment with the health service.

A group of managers and professionals from public health institutions of municipalities in the metropolitan region of Rio de Janeiro, as well as representatives from a non-governmental organization (NGO) discussed the sexual PEP strategy in December 2010, soon after the national recommendation. They evaluated the technical recommendation by the Ministry of Health to evaluate the indication of sexual PEP and concluded that it is insufficient to safely select cases that should or should not receive prophylaxis, agreeing that careful risk assessment and counseling are necessary, on a case-by-case basis, to define the risks of transmission and the need for prevention, but highlighting the lack of various resources for this service, as well as prejudice and moral judgment involved in the evaluation¹⁵.

PRE-EXPOSURE PROPHYLAXIS

PrEP consists of using a daily dose of tablets of one or two ARV for prophylaxis against sexually transmitted HIV. Clinical trials, randomized with placebos, iPrEx and Partners PrEP,

have shown the effectiveness of this technology in HIV prevention¹⁶. The first with the participation of 3,000 men who have sex with men (MSM) and transgender women in the US, South Africa¹⁷ Thailand and Latin America, and the second, with the participation of 4,758 heterosexual serodiscordant couples in Kenya and Uganda¹⁸.

In the FEM-PrEP clinical trial, randomized with placebo, with 2,120 heterosexual HIV-negative women in South Africa, Kenya and Tanzania, the results showed no significant reduction in HIV infection rates (33 infected women in the medication group and 35 in the placebo group) and, for this reason, it was interrupted. These results were related to low adherence to the medication study¹⁹.

TREATMENT AS PREVENTION

TasP is a biomedical prevention technology that, in spite of having already been announced in a statement from the Swiss Federal Commission on AIDS related-issues in 2008²⁰, was demonstrated by the randomized clinical trial HPTN 052, in 2012. The study confirmed that ARV therapy, for reducing viral replication, limits HIV transmission in serodiscordant couples²¹. The study also showed an association between early ARV therapy and a relative reduction of 41% in the number of clinical events related to HIV-1, suggesting a clinical benefit for early ARV therapy when a person has a CD4+ count of 350-550 cells per cubic millimeter, when compared with a treatment that is delayed until the CD4+ count is of 200-250 cells per cubic millimeter²². This result showed that the use of ARV treatment can be part of a public health strategy to reduce the spread of HIV infection²³. However, further studies are needed to show whether the efficacy results of this study would work in the “real world”. Studies are also needed on the impact of treatment as prevention in controlling the epidemic.

This has been called the test-and-treat strategy²¹. Some countries, which recommended the initiation of the ARV therapy when the CD4+ T lymphocyte count was below 350 cells/mm³, started to recommend initiation with a CD4+ T lymphocyte count between 350 and 500 cells/mm³, and other countries recommend treatment as soon as a positive diagnosis for HIV is confirmed, regardless of any CD4+ count. The Department of STD, AIDS and Viral Hepatitis of the Brazilian Ministry of Health recommends the encouragement of antiretroviral treatment (ART) to all HIV-infected people, regardless of their immune status⁹. A major challenge to this type of biomedical prevention technology is the effective adherence to the use of ARVs for HIV by seropositive partners, making the viral load undetectable and providing protection to seronegative partners.

The Joint United Nations Programme on HIV/AIDS (UNAIDS) indicated the need to increase diagnosis and treatment to significantly cover the 35 million people living with HIV in the world today. Only 13.6 million people living with HIV were receiving treatment by June 2014, and 19 million people have no access to knowledge of their serological status for HIV. From this scenario, the Paris Declaration on the World AIDS Day, in December 2014,

recommended that, in order to fight the epidemic, countries should aim to, by 2020: have 90% of people living with HIV aware of their serological status; have 90% of people who know their positive serostatus for HIV receive antiretroviral therapy; have 90% of these people undergoing treatment to obtain suppression of the viral load and have 0% of stigma and discrimination²⁴.

HIV SELF-TESTING

Studies conducted in the US²⁵, Africa²⁶ and Brazil²⁷ investigated the self-testing for HIV, method in which the users test themselves at home, and demonstrated that this alternative can contribute to increasing the coverage and frequency of testing, as well as providing in important prevention strategy, supporting people in making decisions about prevention, about the use of condoms, strategic positioning, choice of partners by serology (serosorting) and relationship agreements regarding sexual partners outside the relationship^{28,29}. The strategic positioning, or sero-positioning, is the act of choosing a different sexual position or practice, depending on the serological status of partners. Normally, a person living with HIV chooses to take the receptive position during unprotected anal sex with a partner who they think is HIV-negative³⁰. This practice is based on the belief that, during unprotected anal sex, the receptive partner is more likely to being infected with HIV than the insertive partner³¹. Serosorting consists of a person choosing a sexual partner with the same HIV status, to exercise unprotected sex in order to reduce the risk of contracting or transmitting HIV³².

A study conducted through the Internet, held in 2009 in the United States, with 6,163 black MSM, reporting unprotected anal sex and lack of knowledge on their HIV status, revealed that 3,833 (62%) said they would undergo the paid home test (at a cost between USD 10.00 and USD 50.00), and 1,236 (20%) said they would not do the home test³³. A study in Seattle, USA, in 2002, showed that of 240 people known to be infected with HIV, 60% indicated that, if possible, would rather have used a home test³⁴. Participants in the latter reported that the main reason for preferring the home self-test is the prejudice suffered in health services because of sexual orientation. Although they varied according to age and race / ethnicity, the main reasons given by the MSM population for never having undergone the conventional HIV testing, in a study conducted through the Internet in the US (2011) and through the National HIV Behavioral Surveillance (NHBS) in 21 American cities (2008), were: low perception of risk, fear of receiving a positive result and structural aspects, such as the lack of transportation, money or health insurance^{8,35}.

In 2011, a randomized study with stages — one with conventional testing and one with home self-testing for HIV with oral fluid — with a population of 133 MSM in Seattle, USA, showed that 96% of men who have undergone the home self-test described it as easy to use, and most men needed little technical support in the pre-test counseling phase³⁶. Another

study in the city of New York, in 2011, recruited 44 MSM through instructional material distributed in places frequented by this population and on Internet sites, of which 12 were ineligible and 32 were included. Participants came to the research site, where they signed an Informed Consent and were invited to participate in two more visits after three and six months. They received 16 kits for self-testing with oral fluid for use with partners, as well as condoms and counseling on HIV and on how to conduct the test at home. They had 24/7 psychological support at their disposal and responded to weekly interviews with psychologist, all by phone. The results showed that participants used the self-test for selection of potential sexual partners. Five new HIV infections were diagnosed during the study, but there was no case of self-aggression, such as suicide attempts. Four participants experienced anxiety problems while waiting for the result and seven were verbally abused without physical violence by their partners²⁹.

In a national survey conducted by Lippman et al. in 2013 in Brazil, among MSM previously tested for HIV, 47% reported that, if available, would undergo the self-test for HIV, and among those not tested or tested infrequently, 90% said they would use the self-test, and 54% who would use it with partners to make choices about unprotected sex³⁷.

A meta-analysis conducted in 2012, with five databases of published works and databases of five major conferences on HIV, showed that, compared to the blood test, the test with oral fluid (OraQuick Advance Rapid HIV-1/2, OraSure Technologies Inc., PA, USA) showed a lower accuracy due to low sensitivity and positive predictive value. This result can be critical if the oral fluid test is used in future PrEP programs, because it may result in increased prevalence if used in some low-risk populations, because of the relative decrease in test sensitivity after infection. The way to minimize this possibility is to use the test in high-risk populations³⁸. Another possibility is the use of the self-test by venipuncture. However, some people said to prefer the oral fluid test rather than self-testing by collecting blood, for fear of the stiletto puncture to remove the drop of blood³⁷.

Although a study in Brazil in 2007 documented the feasibility and acceptability of biological specimens by the self-test for other sexually transmitted diseases, there are few data available on home self-testing for HIV, whether by oral fluid or blood collection through lancing device in Brazil^{27,37,39}. A study with a focus groups to evaluate the acceptance of self-testing, conducted in Brazil in 2013, showed that some users admitted its use and recommended that there was a pre-test counseling work prior to the delivery of the kit, as well as a toll-free phone number for the user to contact in case of questions or in case of positive result for HIV²⁷.

DISCUSSION

The challenges for offering prevention technologies in health span health professionals and service users in their individual dimensions, as well as health services in organizational and structural dimensions⁴⁰.

According to the Survey on Knowledge, Attitudes and Practices related to STD and AIDS of the Brazilian Population aged 15-64 years, conducted in 2008, although more than 90% of people surveyed knew that condom use is the best way to avoid HIV infection, 57% of men did not use condoms in all casual sexual relationships⁴¹. The study by Fernandes with serodiscordant couples has shown that information on new prevention technologies allow some couples, who are not able to use condoms, to reduce their vulnerability to potential exposure to HIV, combining the biomedical technology of the use of ART as prevention and methods for reducing sexual risk, such as *coitus interruptus* and abstinence from anal sex⁴².

The difficulty of continuous condom use is a reality that announces, in many countries, including Brazil, the expansion of the supply of new prevention technologies aimed at reducing the incidence of HIV. There are countless challenges arising from this scenario. The results of the technology presented in the previous section show that the above methods and strategies have limitations, but are beginning to be used in some contexts and situations. When used in combination, there is the use of ARV, the treatment of HIV positive partnership, particularly, and consistent use of condoms can provide more protection than any single strategy.

These strategies were presented at different stages of implementation in Brazil. Some aspects of these strategies remain controversial. The effects that the medicalization from the field of prevention can create, such as a possible relaxation of safer sex practices, with a potential bninhibitory effect, should be considered. The potential impact of long-term adverse effects when these strategies are used at the population scale is not sufficiently clear. The possibility of using use them to benefit exposed risk populations and people living with HIV, such as implementing them in public health programs and overcoming limitations associated with additional immediate costs that would entail, is, therefore, a present challenge. In this sense, sociocultural and acceptability studies to understand the meaning and impact of these strategies in the Brazilian population are key to measure its consequences for public health. Some obstacles may limit the implementation of these strategies in our context, including the remaining conservative and discriminatory moral standards by health professionals, which influence supply and demand for prevention technologies, as well as the difficulty in creating prevention messages that do not cause sexual disinhibition. According to WHO⁷, while the use of ARV is widely used in the world and accepted by managers and decision-makers as a means of treatment, the use of ARVs for prevention is a recent and less widely understood intervention proposal, which requires attention regarding the communication addressed to health workers.

We need to develop/strengthen monitoring and evaluation activities regarding the management of these strategies. What are the barriers for access to measures already recommended by the new national prevention guidelines, such as PEP, to the anticipation of treatment for people living with HIV or to measures related to reproduction? What is the quality of care? Access has been denied to users? Is there a welcoming attitude from

the health teams for the discussion of the possibility of a pregnancy in the context of seropositivity?

In the debate on the implementation of new prevention technologies, some points prevent more effective action: the dichotomy between prevention and care; reducing the user to an intervention object; not considering the contexts of vulnerability when constructing answers to control the epidemic. These points make it impossible to perform actions that actually meet the health needs of people. From an approach that focuses on integrity, “we need to adopt an approach that identifies, from expertise, the needs of prevention and care, and that selects interventions to be offered in each context”⁴³.

The hegemonic healthcare model of a techno-centered, prescriptive and normative conduct present in health services has proved insufficient for technological advances in the fields of HIV care and prevention. On the other hand, the comprehensive care model enhances the effectiveness of prevention strategies as a care device.

In the implementation of PEP (still low in Brazil), states and municipalities can develop methods for promoting the strategy, such as websites, conferences, videos, brochures, training of professionals in the network etc. and produce data and analyzes on the profile and motivations of users in seeking PEP, particularly among civil society organizations and social movements. The experience of Belo Horizonte can be adapted. The municipality has created a folder named “Easy-PEP” with various materials for health professionals.

The lack of adherence, problem observed in all strategies, could overlap the abandonment of the service or treatment, related to a number of factors, ranging from a series of unknown personal motivations to the imperatives of the relationship between health care professional and patient. Thus, the challenges for the Brazilian health services are concentrated not only in the absence of drugs or inputs, but also in work organization⁴⁴. In short, the review of these prevention strategies collectively draws attention to the importance of constructing therapeutic projects that are built on dialogue between users and health professionals, from the specific context of individual encounters⁴³. In other words, more “customized” spaces that allow health professionals to address the individual’s specific situations, risks, difficulties and needs, both to help identify the most appropriate technology for each user (or a combination of prevention technologies) and to solve any difficulties in adherence to the care offered. One cannot ignore that the prevention strategies studied are at different stages of deployment in Brazil, resulting in the need to consider challenges that are sometimes more structural, sometimes more specific.

Sexual post-exposure prophylaxis

Based on the articles reviewed and comparing their results with the Brazilian reality, where studies with services offering this method are still underway, the unsuitable use or non-use of PEP by users of the services calls for the attention of managers in considering the lack

of knowledge on the strategy by the population (including increased exposure groups and risk groups) and its adequate promotion by professionals and managers.

The low perception of risk by users revealed in the articles, if present as a Brazilian reality, reveals the need for an individualized space for the assessment of risk and of the range of available strategies, which, in the Brazilian experience, unlike in other countries, can benefit from the accumulation of reflections and guidelines on counseling. The difficulty of access by users to the prescribed schedule and the discontinuation of use as well suggests the importance of an individualized moment for the analysis of difficulties and the understanding of personal experiences related to the use of PEP.

Sexual pre-exposure prophylaxis

The low adherence to medication shown in all studies should be a challenge to the implementation of PrEP in the Brazilian health system, since some studies also shown difficulties in the work to promote it among users who undergo treatment for AIDS^{45,46}. Medical services usually prescribe ARV medications regardless of the context and the individual and social characteristics of users. Another challenge is the need for periodical testing of users during the use of PrEP in order to check if there was seroconversion and to assess the need to stop the medication to avoid viral resistance. Some studies have shown difficulties on the part of the MSM and transgender women population to test for HIV^{29,47,48}. It would take an assessment of the user's availability to perform the self-test in the recommended frequency for the recommendation of PrEP, and the system's ability to take on this increased coverage for testing, as well as monitoring through some tests, such as renal function and bone density.

Treatment as prevention

Among the factors/ issues raised in the studies, is the fact that adherence also determines the effectiveness of medications in both trials and in clinical practice, evidencing a need to reinforce guidance in this sense⁴⁵. There is some consensus that interventions need better ratings to be recommended in clinical practice, especially in a public health context, requiring identification and approach of high-risk populations. The WHO warns that, in case ARTs are offered in discordant couples, adverse effects of treatment and possible emergence of resistance to ARVs should be monitored⁷.

Self-testing

The HIV epidemic in Brazil is concentrated among MSM and the population of transsexuals and transvestites, with high prevalence among sex workers and injectable drug

users⁴⁹. Compared with the general population, whose prevalence is stable at about 0.4 to 0.6%, HIV prevalence among MSM in Brazil is estimated at between 13.6 and 14.4%⁴⁹⁻⁵¹. However, studies have shown that only about half of the MSM report some history of HIV testing⁵¹⁻⁵³, and of those, only 30% reported testing in the previous year⁵⁴. Currently, the CDC recommends that MSM with increased exposure to risk for HIV should perform the test every 3-6 months⁵². In a recent study conducted in Brazil, with the respondent driven sampling method (RDS), 50% of MSM who had a positive test result were unaware of their infection⁵¹. Late diagnosis continues to be a reality in Brazil, particularly for men⁵⁵. In this sense, strategies are needed to increase engagement and the frequency of testing among MSM.

Studies suggest that the strategy of self-testing for HIV may be particularly attractive to more vulnerable populations such as MSM, transvestites, transsexuals and drug users, who report experiencing discrimination in health services, and serves as a risk reduction method to choose partners for unprotected sex²⁹. The possibility of using the self-test in Brazil requires research and reflection on various aspects involved, among which are the feasibility of using this strategy, forms of distribution of kits, impacts that receiving a positive result at home can cause and ways to minimize them, the type of pre- and post- test to be offered, and places of distribution and 24/7 clinical and psychological support. The self-test through oral fluid requires information to be made available to users in order to prevent any doubts on the possibility of transmission through kissing.

As a set of recommendations suggested after analysis, we highlight:

1. Management: definition of regional strategies for the articulation of networks. Training and sensitization of health professionals, including reception staff, security guards and cleaning staff. Strengthening and multiplication of national guidelines according to local realities. Testing in most vulnerable populations. Reduction of the gap between diagnosis and reception of patients in Specialized Care Services for HIV/AIDS (SAES). Monitoring of the lack of kits and of the delivery time for test results. Implementation of a segment for seronegative individuals in reference health services, including, among others, regular HIV testing, pre- and post-testing, condoms, STD screening, PEP for recent exposure and others.
2. Health professionals: improving listening skills and dialogue. Favoring the perception of users about their risks and vulnerabilities and their adherence difficulties. Creation of spaces for a personalized care, so that the choices and combinations of prevention technologies are contextualized to each user's lifestyle. Awareness of the technologies available on the network and its dissemination. Acting from the perspective of a comprehensive care, so that the possibilities and limits of each person in following the prescribed treatment and guidance, their desires and the care conditions regarding HIV in their daily lives are taken into account. Thus, health professionals can increase

- knowledge on the individual, their context and their way of life, adding more subsidies to healthcare actions, aiming at its practical success.
3. Social control: highlighting the theme of prevention technologies in different spaces. Strengthening and dissemination of ideas in non-metropolitan municipalities. Integration of the AIDS movement with health councils.

CONCLUSIONS

This study discussed the challenges regarding the “new prevention technologies” in health services. We favored information about PEP, PrEP, treatment as prevention and self-testing. This topic has generated controversial issues: the discourse of the medicalization of prevention; a possible loosening of safe sex and adverse effects of medications; the responses of scientific studies that address improvements in treatment for people’s daily lives; economic issues (including expenditures in the acquisition of drugs and relations with the pharmaceutical companies); the costs of such technologies have yet to be properly measured for application in the context of the Unified Health System (SUS).

The Community Consensus Statement on the Use of ARV Treatment as Prevention, from European groups⁵⁶ indicates that there are substantial and conclusive evidence on the effectiveness of TasP in reducing the risk of HIV transmission, but it makes recommendations for its implementation in health services: interventions should be made available in a context of community mobilization; there should be no pressure on people to undergo HIV testing or treatment or to use ARV as prevention, whether from health professionals, partners or others in the community or family, particularly due to gender or stigma; access to health care and treatment for people; no reduction of access or change in the existing methods (e.g., condoms and distribution of syringes to reduce harm for drug users); training of health professionals to inform, clarify and make information available to users, partners and family members about the new strategies ARV use.

Clinical studies have been enthusiastic about the use of some new technologies in some scenarios. However, there are challenges in the sphere of prevention, particularly with regard to the organization of services and the attention given by health professionals to users. Further studies - not only clinical, but sociocultural - are urgently needed to discuss in depth what users in vulnerable contexts want and think. The context of use, the indication, the epidemiological situation and the recommended treatment technology to be offered/ given will depend on the choices of managers, health professionals and people living with HIV/ AIDS. It is therefore a decision that is political, scientific, ideological and referring to assistance at the same time.

REFERENCES

1. Trindade E. A incorporação de novas tecnologias nos serviços de saúde: o desafio da análise dos fatores em jogo. *Cad Saúde Pública* 2008; 24(5): 951-64.
2. Chequer P. A prevenção da Infecção pelo HIV e as novas tecnologias. *Tempus Actas de Saúde Colet* 2010; 4(2): 113-30.
3. Bastos FI. Da persistência das metáforas: estigma e discriminação & HIV/AIDS. In: Monteiro S, Villela W. *Estigma e Saúde*. Rio de Janeiro: Faperj e Fiocruz; 2013.
4. Pereira Junior A. Uma discussão do papel da tecnologia na práxis. *Interface Comunic Saúde Educ* 2000; 4(6): 41-8.
5. Scheffer M. Tecnologia, aids e ética em pesquisa. *Interface Comunic Saúde Educ* 2000; 4(6): 173-6.
6. Ayres JRCM. Práticas educativas e prevenção de HIV/AIDS: lições aprendidas e desafios atuais. *Interface Comunic Saúde Educ* 2002; 6(11): 11-24.
7. World Health Organization (WHO). Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection. Disponível em: <http://www.who.int/hiv/pub/guidelines/arv2013/download/en/> (Acessado em 30 de junho de 2013).
8. Mackellar DA, Hou SI, Whalen CC, Samuelsen K, Sanchez T, Smith A, et al. Reasons for not HIV testing, testing intentions, and potential use of an over-the-counter rapid HIV test in an internet sample of men who have sex with men who have never tested for HIV. *Sex Transm Dis* 2011; 38(9): 419-28.
9. Brasil. Protocolo Clínico e Diretrizes Terapêuticas para Manejo da Infecção pelo HIV em Adultos. Brasília: Ministério da Saúde; 2013.
10. Bryant J, Baxter L, Hird S. Non-occupational postexposure prophylaxis for HIV: a systematic review. *Health Technol Assess* 2009; 13(14): iii, ix-x, 1-60.
11. Cohen SE, Liu AY, Bernstein KT, Philip S. Preparing for HIV pre-exposure prophylaxis: lessons learned from post-exposure prophylaxis. *Am J Prev Med* 2013; 44(1 Suppl 2): S80-5.
12. Sonder GJ, Prins JM, Regez RM, Brinkman K, Mulder JW, Veenstra J, et al. Comparison of two HIV postexposure prophylaxis regimens among men who have sex with men in Amsterdam: adverse effects do not influence compliance. *Sex Transm Dis* 2010; 37(11): 681-6.
13. Lunding S, Katzenstein TL, Kronborg G, Lindberg JA, Jensen J, Nielsen HI, et al. The Danish PEP registry: experience with the use of postexposure prophylaxis (PEP) following sexual exposure to HIV from 1998 to 2006. *Sex Transm Dis* 2010; 37(1): 49-52.
14. Brasil. Ministério da Saúde. Departamento de DST e Aids e Hepatites Virais. Anais do Congresso de Prevenção. Brasília; 2013.
15. Associação Brasileira Interdisciplinar de Aids (ABIA). Reunião sobre profilaxia pós-exposição sexual ao HIV. ABIA: Rio de Janeiro; 2011.
16. Amico R, Liu A, McMahan V, Anderson PL, Lama JR, Guanira J, et al. Adherence indicators and PrEP drug levels in the iPrEx Study. In: 18th Conference on Retroviruses and Opportunistic Infections (CROI). Boston; 2011.
17. Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med* 2010; 363(27): 2587-99.
18. Baeten J, Celum C. Antiretroviral pre-exposure prophylaxis for HIV-1 prevention among heterosexual African men and women: the Partners PrEP Study. In: 6th IAS Conference on HIV Pathogenesis, Treatment and Prevention. Rome: IAS; 2011.
19. Van Damme L, Corneli A, Ahmed K, Agot K, Lombaard J, Kapiga S, et al. Preexposure prophylaxis for HIV infection among African women. *N Engl J Med* 2012; 367(5): 411-22.
20. Hirschel B. The debate continues: does “undetectable” mean “uninfectious”? In: The XVII International AIDS Conference (AIDS 2008). Cidade do México; 2008.
21. Cohen MS, McCauley M, Gamble TR. HIV treatment as prevention and HPTN 052. *Curr Opin HIV AIDS* 2012; 7(2): 99-105.
22. Grinsztejn B, Ribaud H, Cohen M, Swindells S, Badell-Faesen S, Burns D, et al. Effects of early versus delayed initiation of antiretroviral therapy (ART) on clinical outcomes in the HPTN 052 randomized clinical trial. In: XIX International AIDS Conference. Washington DC; 2012.
23. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med* 2011; 365(6): 493-505.
24. UNAIDS. Close the gap – no more stigma: 2014. World AIDS DAY 2014 - campaign materials. Disponível em: <http://www.unaids.org> (Acessado em 30 de janeiro de 2015).
25. Myers JE, El-Sadr WM, Zerbe A, Branson BM. Rapid HIV self-testing: long in coming but opportunities beckon. *AIDS* 2013; 27(11): 1687-95.
26. Sweat M, Morin S, Celentano D, Mulawa M, Singh B, Mbwanjo J, et al. Community-based intervention to increase HIV testing and case detection in people aged 16-32 years in Tanzania, Zimbabwe, and Thailand (NIMH Project Accept, HPTN 043): a randomized study. *Lancet Infect Dis* 2011; 11(7): 525-32.

27. Lippman SA, Veloso VG, Buchbinder S, Fernandes NM, Terto V, Sullivan PS, et al. Over-the-counter human immunodeficiency virus self-test kits: time to explore their use for men who have sex with men in Brazil. *Braz J Infect Dis* 2014; 18(3): 239-44.
28. Gómez AM, Beougher SC, Chakravarty D, Neilands TB, Mandic CG, Darbes LA, et al. Relationship factors as predictors of broken agreements about outside sexual partners: implications for HIV prevention among gay couples. *AIDS Behav* 2012; 16(6): 1584-8.
29. Carballo-Diéguez A, Frasca T, Balan I, Ibitoye M, Dolezal C. Use of a rapid HIV home test to prevent HIV exposure in a high risk sample of men who have sex with men. *AIDS Behav* 2012; 16(7): 1753-60.
30. Snowden JM, Raymond HF, McFarland W. Seroadaptive behaviours among men who have sex with men in San Francisco: the situation in 2008. *Sex Transm Infect* 2011; 87(2): 162-4.
31. Jin F, Crawford J, Prestage GP, Zablotska I, Imrie J, Kippax SC, et al. Unprotected anal intercourse, risk reduction behaviours, and subsequent HIV infection in a cohort of homosexual men. *AIDS* 2009; 23(2): 243-52.
32. Global Forum on MSM & HIV (MSMGF). Serosorting and Strategic Positioning. Technical Bulletin Series [Internet]. Disponível em: http://www.msmgf.org/files/msmgf/documents/TechBulletins/EN/Sec5MSMGF_TechBulletins2012.pdf.
33. Sharma A, Sullivan PS, Khosropour CM. Willingness to take a free home HIV test and associated factors among internet-using men who have sex with men. *J Int Assoc Physicians AIDS Care (Chic)* 2011; 10(6): 357-64.
34. Spielberg F, Camp S, Ramachandra E. HIV home self-testing: can it work? In: National HIV Prevention Conference. Atlanta; 2003.
35. Finlayson TJ, Le B, Smith A, Bowles K, Cribbin M, Miles I, et al. HIV risk, prevention, and testing behaviors among men who have sex with men – National HIV Behavioral Surveillance System, 21 U.S. cities, United States, 2008. *MMWR Surveill Summ* 2011; 60(14): 1-34.
36. Katz D, Golden M, Hughes J, et al. Acceptability and ease of use of home self-testing for HIV among MSM. In: 19th Conference on Retroviruses and Opportunistic Infections. Seattle; 2012.
37. Lippman SA, Périssé AR, Veloso VG, Sullivan PS, Buchbinder S, Sineath RC, et al. Acceptability of self-conducted home-based HIV testing among men who have sex with men in Brazil: data from an on-line survey. *Cad Saúde Pública* 2014; 30(4): 724-34.
38. Pant Pai N, Balam B, Shivkumar S, Martinez-Cajas JL, Claessens C, Lambert G, et al. Head-to-head comparison of accuracy of a rapid point-of-care HIV test with oral versus whole-blood specimens: a systematic review and meta-analysis. *Lancet Infect Dis* 2012; 12(5): 373-80.
39. Lippman SA, Jones HE, Luppi CG, Pinhp AA, Veras MA, van de Wijgert JH. Home-based self-sampling and self-testing for sexually transmitted infections: acceptable and feasible alternatives to provider-based screening in low-income women in São Paulo, Brazil. *Sex Trans Dis* 2007; 34(7): 421-8.
40. Escuder MML, Grangeiro A, Moreno DMFC, Wolffbuttel K, Pupo LR, Monteiro PHN. Avaliação de novas tecnologias para ampliar o acesso aos centros de testagem e aconselhamento em AIDS. Relatório Científico Final [Internet]. São Paulo; 2013. 26 p. Disponível em: sms.sp.bvs.br/lildbi/docsonline/get.php?id=4214.
41. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de DST, AIDS e Hepatites Virais. Pesquisa de conhecimento, atitudes e práticas na população brasileira. Brasília: MS; 2008.
42. Fernandes NM. Vulnerabilidade ao HIV/AIDS entre casais sorodiscordantes acompanhados no Instituto de Pesquisa Clínica Evandro Chagas/FIOCRUZ. [Tese de Doutorado]. Rio de Janeiro: Instituto de Pesquisa Clínica Evandro Chagas; 2013.
43. Mattos RA. A integralidade na prática (ou sobre a prática da integralidade). *Cad Saúde Pública* 2004; 20(5): 1411-6.
44. Melchior R, Nemes MIB, Basso CR, Castanheira ERL, Alves MTSB, Buchalla CM, et al. Avaliação da estrutura organizacional da assistência ambulatorial em HIV/AIDS no Brasil. *Rev Saúde Pública* 2006; 40(1): 143-51.
45. Kashuba AD, Patterson KB, Dumond JB, Cohen MS. Pre-exposure prophylaxis for HIV prevention: how to predict success. *Lancet* 2012; 379(9835): 2409-11.
46. Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. *AIDS* 2006; 20(10): 1447-50.
47. Pinkerton SD, Holtgrave DR, Galletly CL. Infections prevented by increasing HIV serostatus awareness in the United States, 2001 to 2004. *J Acquir Immune Defic Syndr* 2008; 47(3): 354-7.
48. Holtgrave DR, Pinkerton SD. Can increasing awareness of HIV seropositivity reduce infections by 50% in the United States? *J Acquir Immune Defic Syndr* 2007; 44(3): 360-3.

49. Malta M, Magnanini MM, Mello MB, Pascom AR, Linhares Y, Bastos FI. HIV prevalence among female sex workers, drug users and men who have sex with men in Brazil: a systematic review and meta-analysis. *BMC Public Health* 2010; 10: 317.
50. Baral S, Sifakis F, Cleghorn F, Beyrer C. Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000-2006: a systematic review. *PLoS Med* 2007; 4(12): e339.
51. Kerr LR, Mota RS, Kendall C, Pinho AA, Mello MB, Guimarães MDC, et al. HIV among MSM in a large middle-income country. *AIDS* 2013; 27(3): 427-35.
52. França Junior I, Calazans G, Zucchi EM. Changes in HIV testing in Brazil between 1998 and 2005. *Rev Saúde Pública* 2008; 42(Suppl 1): 84-97.
53. Salani Mota RM, Sansigolo Kerr LR, Kendall C, Pinho A, de Mello MB, Dourado I, et al. Reliability of self-report of HIV status among men who have sex with men in Brazil. *J Acquir Immune Defic Syndr* 2011; 57(Suppl 3): S153-6.
54. Tun W, de Mello M, Pinho A, Chinaglia M, Diaz J. Sexual risk behaviours and HIV seroprevalence among male sex workers who have sex with men and non-sex workers in Campinas, Brazil. *Sex Transm Infect* 2008; 84(6): 455-7.
55. Grangeiro A, Escuder MM, Pereira JC. Late entry into HIV care: lessons from Brazil, 2003 to 2006. *BMC Infect Dis* 2012; 12: 99.
56. Community consensus statement on the use of ARV treatment as prevention; 2013. Disponível em: <http://www.aidsmap.com/> (Acessado em 22 de janeiro de 2015).

Received on: 02/14/2014

Final version presented on: 10/25/2014

Accepted on: 05/22/2015