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Health

HIV/AIDS:



Preventive interventions to control and combat the spread of HIV in Africa: A review on what works and what does not*

July 2001

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**A commissioned paper established in the context of the mandate
t.751-14 / VGU/SKM/REM of the Swiss Agency for Development and Co-operation
(SDC)**

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This paper was commissioned by the Swiss Agency for Development and Cooperation (SDC). The views and ideas expressed herein are those of the authors and do not necessarily imply or reflect the opinion of the Agency.

Preventive interventions to control and combat the spread of HIV in Africa: A review on what works and what does not

1. Summary

Since its appearance, HIV has infected and killed millions of people, most of them in developing countries and especially in sub-Saharan Africa. Recently, curative interventions, including antiviral therapy have been at the forefront of public discussion. However, preventive measures to avert new infections still remain the primary concern for developing countries. This document reviews the evidence of what works and what does not work in preventing HIV transmission and spread in Africa.

The number of new infections of HIV can be reduced by highly cost-effective interventions. They do include peer education focusing on sex workers and heterosexual man at high risk as well as case management of persons affected by sexually-transmitted infections. Other effective interventions are the promotion of use of condoms through social marketing of condoms, and the prevention of mother-child transmission.

The feasibility to implement these interventions may vary according to a given political, social, cultural and economic context as well as according to available resources. While planning and implementing activities against the spread and the transmission of HIV/AIDS, the above mentioned interventions should have priority. However, in Africa most importantly it appears that there must be a high political and moral commitment in order to sustain positively the impact of preventive measure against HIV/AIDS. Further research and follow-up of evidence of what works and what does not is needed. Furthermore, there must be a strong increase in financial investments allowing the implementation of effective and feasible interventions against HIV/AIDS.

Of special relevance for SDC non health sector programmes are peer-based activities addressing high-risk heterosexual men and management of sexually-transmitted diseases among collaborators and employees. Promotion of condom use among them is also wishful and feasible.

2. Introduction

HIV/AIDS has emerged as a highly complex and constantly evolving epidemic that poses a grave threat to individuals, families, societies, and economies worldwide. Nowhere this is more true than in developing countries, where more than 90 percent of all HIV infections have occurred to date. UNAIDS estimates that 50 million people have become infected with HIV, primarily in Africa and Asia, of whom 16 million have already died. In many sub-Saharan African countries the prevalence of HIV in the young adult population exceeds 20%, with the vast majority resulting from heterosexual transmission. The impact of AIDS is far greater than for those directly infected and/or sick: there is a good amount of literature revealing high cost imposed to families and to society due to treatment and examination costs of a sick person, due to foregone workforce, due to expenditures related to funeral ceremonies, etc.

Social and economic factors such as poverty, marginalization, inequity of gender and race, and migrant labour practices foster behaviours and attitudes favouring the rapid spread of HIV/AIDS and underlie the epidemic³. Thus, AIDS is most relevant to development issues. But, making the control of the epidemic depending on overall development achievements, such as the reduction of poverty, disturbs as the origins cannot be easily cured. Improved education for girls, labour force participation by women, and good governance do reduce poverty, but will take decades to have a genuine impact. With many becoming infected every year, it is not possible to wait for poverty and inequality to end².

While reviewing efforts in combating the HIV/AIDS epidemic, several lessons appear^{1,2}: For example, early projections by the Global Program on AIDS and the World Bank underestimated by around 50% the actual global prevalence of HIV/AIDS in 2000^{4,5}. Important transmission routes, such as breastfeeding, were denied until recently. In some countries, HIV screening of blood was unnecessarily delayed⁶. More generally, there was so far no strong commitment to base planning and implementation of control measures against HIV/AIDS on evidence, or in other words: to assess what works and what does not in preventing HIV transmission and spread.

Based on two papers^{1,2}, this document looks at key interventions to reduce transmission of HIV and establishes a link to SDC non health sector programmes. More precisely strengths and weaknesses of the following prevention strategies are reviewed:

- Education through mass media
- Social marketing of condoms
- Peer education among high risk groups (sex workers, males with high-risk heterosexual behaviour)
- Improved management of sexually transmitted diseases
- Reduction of transmission of HIV through the improved blood supply
- Voluntary counselling and testing including partners of HIV positive testing
- Prevention of mother-to-child / vertical transmission including promotion of replacement feeding
- Promotion of male circumcision
- Other prevention strategies: sexual education of the youth, improvement of syringe utilisation, vaccination

3. Preventive interventions to reduce the transmission of HIV

3.1 Mass Media Education

Information, education and communication (IEC) approaches are highly effective in increasing knowledge of HIV and AIDS. Their impact on behavioural changes may be less strong and experiences from several industrialized countries have shown improvements in levels of HIV-related knowledge following mass media campaigns, but limited effect on behaviour. Even where behavioural change follows a mass media intervention program, the impact may be short-lived^{1,2}.

The effects of mass media campaigns in developing countries is not well documented. In Brazil or India it has been observed that the mass media are an important source of knowledge regarding HIV, but that this knowledge is inadequate and contains misconceptions.

HIV/AIDS related information circulated through mass media can be used to increase general knowledge on the disease. This may also create a basis for other interventions such as peer education or social marketing of condoms. However, there is no evidence of a direct impact of information disseminated through mass media on behavioural change, for example among high risk groups. However, the content and form of the messages have to be locally adapted and take into account feelings and values of people. Certainly, mass media efforts alone are not sufficient to control the spread of HIV/AIDS and generally person to person contact (see chapter 3.3) are known to have a higher impact on behavioural change.

3.2 Social marketing of condoms

Condoms are highly effective in preventing HIV transmission, both directly and by reducing the transmission of other Sexually Transmitted Diseases (STIs). However, even people who are fully aware of the risks of HIV and of the protective benefits of condoms may not use them. Interventions that lower the costs related to the use of condoms and aim to increase their social acceptability would be expected to increase condom use and reduce HIV transmission³. Programmes of social marketing of condoms aim to achieve all of these objectives: they sell condoms at low, heavily subsidised prices; they make condoms readily available by selling them at outlets, such as pharmacies, drug stores, truck stops, bars, and hotels; and they increase the social acceptability of condoms with advertising campaigns and grass roots activities, such as street theatre, that show condom use as normal, healthy, and even fun.

In many countries of Africa, sales of condoms has increased dramatically after the introduction of social marketing programmes. These programmes have been subsidised by international donors.

For African countries the impact of social marketing programmes of condoms has been so far limited. Although many countries promoted condoms under brand names such as “Prudence” or “Salama” and utilisation rates per adult per year may have gone up to three condoms, the spread of the transmission of HIV could not be stopped. Nevertheless, the potential impact of social marketing of condoms coupled with reduction in taxes and tariffs can be seen in Brazil. Before the social marketing programme campaign began, condom costs were around \$1 each, and market volume were stagnant at about 45 million pieces. In 1991, subsidised condoms priced at about 0.2 \$ each, were launched and by 1995 the total market volume had more than tripled³.

Definitively, social marketing of condoms alone has not shown to lower the spread of the HIV/AIDS epidemic in Africa and the control of the epidemic can only be achieved by joining social marketing efforts with other interventions.

3.3 Peer education

3.3.1 Peer education among female sex workers

Sex workers are usually among the groups who are first infected by HIV. They play an important role in further spreading the disease to their clients. They in turn further transmit HIV to

their other female sex partners. Thus female “women in sex work are at enormous risk of acquiring and transmitting HIV, and unsafe sex for money has driven the HIV epidemic in many countries of Africa.”². *“Each infection prevented “upstream” among female sex workers prevents all “downstream” ones. The centrality of unprotected sex within core groups to the epidemic is perhaps best illustrated by the observation that major heterosexual HIV epidemics only occur in societies where unprotected commercial sex is common”*².

*“Around the world, it has been consistently possible through peer programs to increase condom use by sex workers to high levels, maintain high levels of condom use over long periods, reduce the incidence of HIV and other sexually transmitted infections among sex workers and prevent further spread of infections”^{7,8,9}. One intervention project among 2000 sex workers in the Pumwani area of Nairobi has been estimated to prevent some 6,000-10,000 infections annually¹⁰. Thailand acted upon this insight with national-scale interventions targeting sex workers and the military; a significant decline in HIV incidence resulted and HIV prevalence has stabilized at approximately 2% of the adult population. India has adopted this approach as a central element in its new national AIDS control strategy”*².

An advantage of peer education targeting female sex worker is that they can be implemented by NGO’s. Furthermore, they do not need to rely on well operating health services.

While the usefulness of these programs is being understood, they may face also strong difficulties. In many contexts it is problematical to identify and to target female sex workers as they work semi-illegally or may only temporally follow this occupation. The women concerned and the surrounding social and cultural context may also not see them as sex worker making targeting not easy at all. Furthermore, there exist many transitory forms of prostitution. Thus, peer group interventions among sex workers is only a feasible approach in a very restricted number of settings such as large cities, where sex workers can easily be identified.

Furthermore, peer education among female sex workers risks to accuse and stigmatise additional a social group which is already marginalised. Thus it is important to include in peer education activities also the clients (see following chapter).

3.3.2 Peer education among high-risk heterosexual men

Peer education usually involves training and supporting members of a given group to effect change among members of the same group¹¹. Peer education is often used to effect changes in knowledge, attitudes, beliefs, and behaviours at the individual level. However, peer education may also create change at the group or societal level by modifying norms and stimulating collective action that contributes to changes in policies and programmes.

As female sex workers, male with risky behaviour (e.g. unprotected sex) play a crucial role in spreading HIV. Thus targeting this group of men may have potentially a huge impact. However, interventions addressing this group may be more difficult to implement than controlling the epidemic among sex workers.

High risk heterosexual men include groups of persons being not controlled by their direct social environment and/or absent from their usual partner, such as civil servants on travel, migrant workers, truck drivers or military persons. These groups may be targeted by peer educa-

tion at their workplace and relatively easy. Recently a study in Latin America assessed the distribution of condoms and information in motels and showed an important increase in condom use¹². Other groups of men with high risk behaviour may be more difficult to categorise and thus more difficult to target.

3.4 Improved management of sexually transmitted infections

Sexually transmitted infections (STIs) exist throughout the world. But although the HIV/AIDS epidemic has increased awareness of other STIs, their true scope, impact and consequences remain hidden. Reasons for the underestimation of the importance of STIs may be linked that they are often viewed as easily to be cured and without serious or irreversible disease, or as affecting only marginalised populations. They are associated with the delicate subject of sex and sexuality. They can be asymptomatic, especially in women. The World Health Organization estimated that there were at least 333 million new cases of four curable STIs in 1995. This figure includes only trichomonas (170 million), chlamydial infection (89 million), gonorrhoea (62 million) and syphilis (12 million). The burden of these new infections, in both number and health consequences, falls most heavily on the developing world.

The presence of STIs has shown to increase susceptibility to HIV infection. STIs also increase HIV shedding in the genital tract, thereby increasing the infectivity of an infected person¹. These considerations prompted a large study in Tanzania, which revealed that STI management to the general population can reduce new cases of HIV by 40%¹³. However, another study conducted in Uganda failed to reduce HIV incidence. For improved case-management a lot is still not known specially about costs and effectiveness and only one study does exist, which suggests that this intervention is favourable considering costs and results¹⁴.

However, longer term follow-up of interventions to improve the management of STIs in Mwanza suggest a reduction in STIs¹⁵. In addition, it has clearly been demonstrated that the presence of STIs is a risk for HIV infection. Thus, while STIs definitely contribute to the spread of HIV, the best strategies for controlling them, particularly in generalised epidemics, is not yet known. In terms of prevention condoms have clearly an important role to play. Since having an STI is an indicator for risky behaviour related to HIV, STI patients are an important target for interventions for example through peer group education (see chapter 2.3) and may contribute to HIV prevention and control.

3.5 Reduction of transmission of HIV through the improved blood supply

Globally it is thought that between five and ten percent of new infections with HIV happen due to contaminated blood and blood products, with a higher percentage of women and children being infected¹⁶. A high proportion of infected transfusion contaminate the recipient (around 90%). Contrasting with this situation, only about a third of countries in sub-Saharan Africa have so far endorsed and subsequently implemented a national policy on safe blood transfusion services¹⁷.

It is estimated that only around a fifth of blood transfusion services in Africa can guarantee to offer blood that is free of pathogens¹⁶. This is because screening facilities may simply not exist or the technical standard of facilities does not allow a screening of HIV antibodies. Fur-

thermore reagents for testing HIV may not adequately be stored, expired, wrongly used or temporally out of stock.

Improved blood transfusion services rely on capacities of the health care delivery system. Interventions which may reduce HIV transmission include:

- HIV antibody screening: The most accurate test for testing for HIV are the antibody ELISA and the HIV antibody Western blot test. When used together, the results from this two-part testing are greater than 99% accurate. Western blot is a confirmatory test. Results from an HIV antibody ELISA test should never be used alone to report a positive final result. The volume of test in a given laboratory, blood bank or health service may influence the test being used. However, testing the blood for HIV costs and can be an expensive component of the overall health care system. Thus, in many situations health care systems do not have sufficient resources to guarantee a regular screening for HIV antibody.
- Avoiding unnecessary blood transfusions: In many situations, blood transfusions are necessary for the survival of a patient. For example surgical procedures may require a blood transfusion. Opposite it is reported that unnecessary blood transfusions are often given to “revitalize” patients for a range of conditions, such as anemia². So it appears important to promote and implement guidelines for a rational use of blood transfusions. These guidelines should also include a focus on the promotion of the use of antenatal care services by pregnant women in order to detect early persons at risks for a transfusion during delivery.
- Excluding high-risk donors: High risk groups providing contaminated blood may be an important source of transmission of HIV¹⁸. In excluding these groups from blood transfusion services the percentage of contaminated blood would decrease. However, with prevalence rates such high as forty percent in some African countries, this option is not feasible in all countries.

3.6 Voluntary counselling and testing

Voluntary counselling and testing (VCT) is currently seen by many as an effective preventive measure to control the spread of HIV and access to VCT services is often seen as a priority intervention. However it has to be emphasised that the availability of testing alone is not sufficient: information and empowerment of the community are crucial. Testing should be voluntary and confidential, and should be accompanied by counselling. Counselling is important to prepare clients to come to terms with their HIV status: this includes dealing with fear, guilt, stigma, discrimination, care for a chronic condition, the possibility of early death, and to give them an understanding of what they can and should do about HIV infection, should they be infected. It is also important in helping people devise or strengthen ways of staying HIV negative, if they test HIV negative.

In order to be effective, the implementation of VCT services requires many elements. They include test kits and reliable testing procedures, reliable links to services for HIV/AIDS care and support (particularly prophylaxis and treatment of HIV-related infections), to social and psychological support services, and to palliative care¹⁹. Community awareness, education and mobilization is necessary to ensure that those wishing to be tested understand what the test process is and where testing may be undertaken, and to ensure that those who are tested and found infected are provided comprehensive care rather than being discriminated against. Good quality VCT services require the training of people in minimum standards of counselling and psychological recognition, in acute management and onward referral.

Today, the effect of VCT on HIV risk behaviours and on the control of the spread of the HIV/AIDS epidemic remains uncertain. The most consistent effects have been observed among HIV discordant couples. There are very few studies of the efficacy of VCT in developing countries, where there are many impediments to their implementation.

3.7 Prevention of mother-to-child transmission

UNAIDS estimates that in 1998 nearly 600,000 children acquired HIV infection from their mothers. Worldwide, WHO estimates that there were about 470,000 HIV deaths annually among children under age 5, or about 4% of all under-5 deaths²⁰. HIV transmission rates from untreated breastfeeding HIV-infected mothers to their newborns range from 25% to 48%. Up to half of these infections are believed to be due to breastfeeding, the rest to intrauterine and intrapartum transmission.

Studies have shown that it is possible to prevent a significant proportion of mother to child transmission through the use of antiretrovirals to disrupt transmission and/or replacement feeding:

- Antiretrovirals (ARV) It has been shown that ARV applied at the end of pregnancy can reduce transmission in an important way²¹. However, extending treatments from small-scale studies or pilot interventions to the general population may be difficult. First of all this would require a systematic identification of HIV status of women during pregnancy. Then, in many situations health care delivery systems may have difficulties in informing adequately and appropriately women as well as in providing regularly ARV treatment.
- Replacement feeding: The frequency of mother-to-child transmission can be reduced by using substitutes for breastmilk feeding. Transmission through breastmilk is an important way of transmission and between a third and half of children from infected mothers get themselves infected. Thus, replacement feeding may prevent HIV infection. Opposite, and as breastmilk has an important protective effect for example against malaria, and respiratory disease, substitutes may have the risk to increase mortality rates of children. Furthermore, in many situations unhygienic water used for milk substitutes is responsible for diarrhea. Cultural values of many communities do also not allow a women to stop breastfeeding of a child before the age of two.

New infections in babies from their mothers can be averted through the application of the anti-retroviral therapy during pregnancy, and through the promotion of substitutes for breastmilk feeding. Although these interventions might be wishful, a large-scale implementation may be difficult. Thus, the prevention of new infections in mothers seems often more appropriate and efficient, especially in low prevalence situations¹.

3.8 Other prevention strategies

3.8.1 Promotion of male circumcision

The increase in male circumcision is a potential other strategy to reduce the frequency in HIV transmission. There is evidence indicating that uncircumcised men are at higher risk of HIV

infection^{2, 22}. Thus, the promotion of circumcision among men could reduce the risk of HIV infection.

Although circumcision would be "counterproductive if men believe that the procedure [alone] will protect them" from HIV, the procedure is gaining favour in eastern and southern Africa²³. Still important efforts are to be done in the plea to the international health community to assist the public with education, training and safe circumcision services and hardly any experience does exist yet in promoting such services.

3.8.2 Educational programs for youth

As high incidence rates of HIV infection are frequently observed among young people in developing countries, protecting youth is a goal of all HIV prevention programming. There is little evidence that general educational interventions for youth reduce HIV or STI incidence^{1,2}. "Studies which have examined impact of such interventions, chiefly those focused on curriculum changes, or school-based information campaigns, for the most part have found that, while knowledge often improves, there is little evidence for sustained adoption of safer sexual behaviours. Focused programs that use more peer education are have so far not been well tested and evaluated"^{1,2}.

While it is clearly necessary to provide youth with accurate information on protecting themselves against HIV, general youth education programs alone have limited impact on behaviour. The best way to protect youth is to reduce HIV transmission in general. Further research on models for higher-risk youth is required.

3.8.3 Improving syringe utilisation

Unsafe injection practices throughout Africa result in many new HIV infections. Although most injections given in the world follow safe clinical practices, poor injection practices continue to transmit infections on a large scale in many countries.

Reasons for popular demand for injections include beliefs that injections are stronger medications, that injections work faster, that the pain of the injection is a marker of efficacy, that a drug is more efficient when entering the body directly, and that injections represent a more advanced technology²⁴. Among healthcare workers, motivations for overuse of injections include belief of a better efficacy of injected drugs, ability to directly observe therapy, and thus compliance with treatment regimens, and, sometimes, financial incentives. In some healthcare systems, healthcare providers can charge a higher fee if they administer an injection leading to unnecessary injection practices.

Reasons that explain unsafe and unnecessary injection practices include lack of awareness regarding the risks associated with unsafe injections, lack of injection supplies, lack of efficient sterilisation techniques and lack of disposal infrastructure for injection equipment. For health budgets with limited resources, appropriate measures can and must be taken to avoid this route of transmission of disease. To prevent injection-associated infections it is recommended to implement a three-element strategy²⁵ consisting of (1) change behaviour among patients and healthcare workers to reduce injection over-use and achieve injection safety, (2) ensure

sufficient availability of sterile syringes and needles, and (3) appropriately destroy sharps waste after use.

Today few experiences to improve syringe utilisation by health services and other providers (pharmacies, informally operating health care workers, private services) have been documented and no clear evidence exists on what works efficiently.

3.8.5 Vaccination

As with other viral epidemics, a HIV vaccine offers the best method for ending deaths from the AIDS epidemic. No HIV vaccine is available today. During the past two years, the pipeline of new AIDS vaccine designs has significantly widened, with a greater emphasis on vaccine designs applicable for use in the developing world, through a series of innovative public-private sector partnerships¹.

“Thus, the current themes that underlie the new push in HIV-1 vaccine development are: First, to investigate a broad array of strategies, not just those that are the most promising. Second, to employ a variety of immunogens and vectors in combination, to enhance immunity. Third, to push ahead with human trials of imperfect vaccines earlier rather than later since these will give us important immune correlates of protection or the lack thereof on which to design the next generation of vaccines. Finally, to use non-human primate models to investigate novel strategies but recognizing their limitations, not allow non-human primate studies to unnecessarily delay human trials. Finally, it is clear that even with the most optimistic forecasts, a relatively effective and safe vaccine that can be widely distributed is a number of years away”¹.

Clearly, a vaccine against HIV is not something for the near future and it will take at least five to ten years until vaccination as preventive intervention may be available. In the meantime, efforts to combat the spread of the epidemic must rely on other preventive and curative interventions.

4. Relevance of prevention of HIV/AIDS to SDC non health sector programmes

Table 1. Feasibility, relevance and cost-effectiveness of various prevention strategies against the spread of HIV/AIDS

Preventive intervention	Political and cultural feasibility in Africa including relevance	Cost-effectiveness	Relevance for SDC non health sector programmes including employees of SDC
Mass-media education	++	+	+
Social marketing of condoms	++	++	++
Peer education			
Peer education among female sex workers	+	+++	+
Peer education among males with high-risk heterosexual behaviour	++	+++	+++
Improved management of sexually transmitted diseases	+	+++	+++
Reduction of transmission of HIV through the improved blood supply	++	+	+
Voluntary counselling and testing	+	+	+
Prevention of mother-to-child transmission	+	++	++
Other prevention strategies			
Prevention of male circumcision	+	+++	+
Educational programs for youth	+++	+	+
Measures among infecting drugs users	+	+	+
Improving syringe utilisation	++	?	+
Vaccination	-	-	-

+ = weak; ++ = medium; +++ = high

Table 1 resumes the political and cultural feasibility in Africa, the cost-effectiveness and the relevance for Swiss Agency for Development and Cooperation (SDC) non health sector programmes (including interventions targeting employees and collaborators of SDC) of different prevention strategies against the spread of HIV/AIDS in Africa. Clearly the presented preventive interventions are a narrow list of potential activities for the reduction of the transmission of HIV/AIDS and issues such as the vulnerability of concerned people are not taken into account. However, highly effective interventions that may reduce the spread and transmission of HIV include peer-based programs targeted to sex workers and high-risk heterosexual men and management of sexually-transmitted diseases. In addition, effective interventions to reduce transmission through social marketing of condoms, and from mother to child are also available. Of special relevance for SDC non health sector programmes are peer-based activities addressing high-risk heterosexual men and management of sexually-transmitted diseases among collaborators and employees. Promotion of condom use among them is also wishful and feasible.

5. Conclusions

Since the beginning of the HIV/AIDS epidemic, various preventive and curative measures have emerged in response to the disease. There is an increasingly strong commitment of the various actors to control and reduce the spread of the epidemic, but still much has to be done in combating new infections. The HIV/AIDS epidemic continues to grow and affects an increasing number of persons and households in developing countries, especially in sub-Saharan Africa. There is an urgent need to identify feasible, sustainable and cost-effective interventions. Thus, this paper has looked at preventive interventions in order to review on what works and what does not by using evidence from published and unpublished documents^{1,2}.

This evidence shows that the number of new infections of HIV can be reduced by highly cost-effective interventions. They do include peer education focusing on sex workers and heterosexual man at high risk as well as case management of persons affected by sexually-transmitted infections. Other effective interventions are the promotion of use of condoms through social marketing, and the prevention of mother-child transmission.

Political, social, cultural and economic factors as well as available resources do affect the feasibility to implement and sustain preventive interventions. However, the above mentioned interventions should have priority in combating the HIV/AIDS epidemic. Further research and follow-up of evidence of what works and what does not is needed.

Of special relevance for SDC non health sector programmes are peer-based activities addressing high-risk heterosexual men and management of sexually-transmitted diseases among collaborators and employees. Promotion of condom use among them is also wishful and feasible.

A high political and moral commitment in order to sustain positively the impact of preventive measure against HIV/AIDS is crucial²⁶. Furthermore, were must a strong increase in financial investments allowing the implementation of effective and feasible interventions against HIV/AIDS.

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