

HIV prevention for young people in Sub-Saharan Africa: effectiveness of interventions and areas for improvement. Evidence from Rwanda¹

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1. Introduction

Following the explosion of the HIV epidemic at the beginning of the 1980s, the number of people living with HIV increased at a staggering rate. The peak of new infections occurred in the mid-nineties with 3.5 million [3.2 million – 3.8 million] new infections. Since then, the number of newly infected people has been decreasing slowly. Since the peak in HIV deaths in 2004 (2.2 million [1.9 million – 2.6 million]), due to the widespread introduction of anti-retroviral treatment, also the number of AIDS-related deaths started to decrease. [1]

The continued large number of infections and a longer life expectancy of HIV-positive people, have resulted in an ever increasing number of HIV-positive persons worldwide. Recent UNAIDS data show that an estimated 34.2 million people were living with HIV worldwide in 2010. This means that about 1% of the adult world population is infected with the virus. In 2011, an estimated 1.7 million people died of an AIDS-related cause and 2.5 million new infections occurred. Seven thousand people get infected with HIV every day. [1]

With 12% of the world population and almost 70% of HIV infections, sub-Saharan Africa is carrying the greatest burden. Within this region, we find large differences between countries, e.g. Mauritania with an HIV prevalence of the adult population (15 to 49 years) of 0.7% [0.6% – 0.9%], Cameroon with 5.3% [4.9% – 5.8%] and Swaziland with 25.9% [24.9% – 27.0%] [2]. While these data might be subject to reporting or measurement biases, the large differences between the countries indicate the existence of important differences within the sub-Saharan African region.

¹ This is the report of PhD research carried out at Ghent University, under the supervision of Marleen Temmerman and Ronan Van Rossem.

Young people, in particular, are severely affected by the epidemic; on average, 2,500 young people (15-24 years) get infected with HIV every day and 80% of these infections take place in sub-Saharan Africa. This is reflected in a regional HIV prevalence of 1.4% in young men and 3.3% in young women, making young people an essential population for turning the tide of the epidemic. [1]

Since no cure or vaccine is available, reducing sexual risk behaviour in this population of young people is crucial in tackling the epidemic. Hence, many governments, non-governmental and international organizations are investing in HIV prevention interventions to prevent sexual transmission of HIV among young people in this region. In order to prevent sexual transmission of HIV, a number of strategies can be adopted: biomedical prevention (e.g. male circumcision, microbicides or treatment as prevention), individual behaviour change strategies and structural interventions. Our study focuses on the latter two.

Behaviour change interventions promote actions such as: abstinence or delaying the onset of first sexual intercourse, increasing condom use and reducing the number of sexual partners. Additionally, they aim to increase knowledge, change attitudes, improve access to services and to reduce stigma or address other mediators as self-esteem and self-efficacy [3, 4]. As Coates puts it [5]: “Behavioural strategies attempt to motivate behavioural change within individuals and social units by use of a range of educational, motivational, peer-group, skills-building approaches, and community normative approaches”. Structural approaches to HIV prevention, on their turn, “seek to change social, economic, political, or environmental factors determining HIV risk and vulnerability” [6]. In practice, structural interventions might address factors as gender inequality [7], the economic situation of young people [8] or stimulating young people to go to school [9].

At the start of our doctoral research, evaluations of prevention interventions and literature reviews on aspects of HIV prevention interventions for young people (e.g. media interventions, school-based interventions) suggested limited effectiveness of these interventions in changing young people’s sexual behaviour and HIV incidence [10-15].

2. Objectives, methods and results

Given that young people remain at the centre of the HIV epidemic, the general objective of this study was to improve the effectiveness of HIV prevention interventions for young people in sub-Saharan Africa.

To this end, we identified four specific objectives:

- To assess the overall effectiveness of HIV prevention interventions for young people in sub-Saharan Africa;
- To assess the effectiveness of a peer-led school-based HIV prevention intervention in Rwanda;
- To identify and study possible reasons for the observed limited effectiveness of HIV prevention interventions for young people in sub-Saharan Africa;
- To formulate recommendations to improve the effectiveness of HIV prevention for young people.

These objectives were reached using a mix of different quantitative and qualitative methodologies. The advantage of combining several research methods is that they can counteract each other's weaknesses while taking advantage of the particular strengths of each method; combining research methods most likely results in a more complete picture of the topic under study.

In total, eight sub-studies were included in the doctoral thesis. In this section we present, per objective, six of these studies.

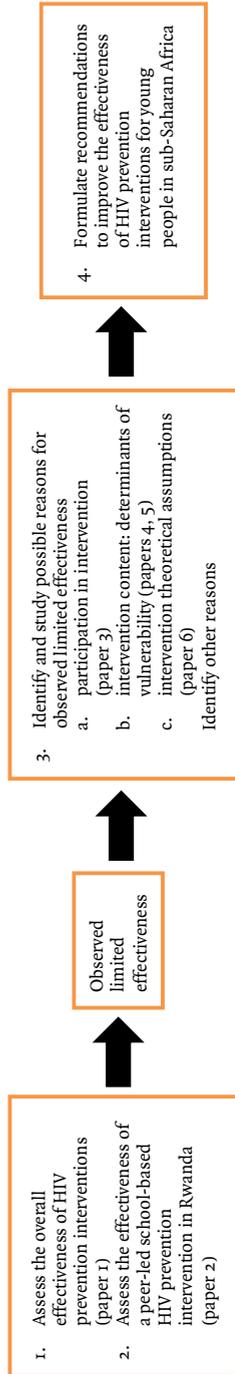


Figure 1: Overview of doctoral research objectives

2.1. To assess the overall effectiveness of HIV prevention interventions for young people in sub-Saharan Africa

Our first objective was to assess the overall effectiveness of these interventions for the population of young people in sub-Saharan Africa, given that there were indications that they were not very effective. This was done through a systematic literature review and meta-analysis. Three online databases were searched using pre-specified terms. Additional articles were identified on websites of international organizations and by searching bibliographies. A study protocol described procedures for the literature search strategy, the inclusion criteria, the data to be extracted, the extraction procedure and the data analysis methods. [16, 17]

This study demonstrated a paucity in qualitatively evaluated HIV prevention interventions for young people in sub-Saharan Africa. Surprisingly little information was available on youth interventions in sub-Saharan Africa: only 28 studies were identified with as few as two studies collecting biological endpoints, and many studies had suboptimal study designs. Most interventions were set in school, and the majority took place in urban areas. The duration varied between 1 hour and 3 years.

The interventions showed limited effectiveness of HIV prevention interventions for young people in sub-Saharan Africa: No positive effects on sexual behaviour (being sexually active, recent sexual activity, number of sexual partners) were detected and condom use at last sex only increased among males [relative risk=1.46; 95% confidence interval=1.31 – 1.64], but remained at a low level. One study reported a reduction of herpes simplex virus-2, but not HIV incidence. Effects were larger in males, in highly exposed youth and in younger adolescents.

A number of studies ascribed the limited impact of interventions to poor implementation of the interventions (e.g. reluctance of teachers and health professionals to discuss condom use with youth, resource constraints and general disorganization). But limited effectiveness might also stem from flaws in the assumptions underlying HIV risk reduction interventions. Although the interventions varied markedly in the setting and delivery strategies they adopted, they predominantly focused on HIV/AIDS as a means of changing sexual risk behaviour. However, the existence of a direct causal link between sexual behaviour and HIV infection does not mean that the converse is true. From an ecological perspective, HIV/AIDS is only one factor among a great number of interacting factors which operate on different levels to influence sexual behaviour.

2.2. Assess the effectiveness of a peer-led school-based HIV prevention intervention in Rwanda

To achieve more hands-on insight into how such interventions are developed, implemented and evaluated we evaluated a peer-led school-based HIV prevention intervention in Rwanda. The intervention took place in all fifteen secondary schools in the district of Bugesera (Rwanda) and was developed and implemented by the Rwandan Red Cross. The general objective of the peer education program was to reduce sexual risk behavior and to promote sexual and reproductive health in the secondary school communities by activating the anti-AIDS-clubs in the schools. The intervention consisted of an initial six-

day training for five students (peer educators) of each participating school, as well as for one teacher per school who was tasked with supporting the peer educators in their daily activities. The training consisted of information on the Red Cross and its main principles, HIV/AIDS, sexually transmitted diseases, family planning and pregnancies, the role of the peer educator (what is expected of a peer educator and what is the deontology of a peer educator?) and teaching methods (how to best approach students and how to transmit messages and counsel?). School principals attended a half-day information session on the program. The peer educators were selected by the disciplinary teacher, who lives in the school and knows the students well, based on a number of predefined criteria (personal characteristics, sex, study year).

We used a longitudinal nonrandomized controlled trial. In fourteen schools (eight intervention and six control schools) 1,950 students completed a standardized questionnaire at baseline. We undertook two additional measurements, six and twelve months in the intervention. Statistical analyses were done in Stata and SAS, using propensity score matching, generalized estimation equations and multivariate regression analysis. [18]

The overall retention rate was 72%. The evaluation study in Rwanda confirmed the difficulty of changing young people's sexual behaviour: the intervention did succeed in increasing young people's perception that AIDS is a serious disease and reduced self-reported enacted stigma. However, multivariate analyses showed no significant differences in sexual risk behavior (being sexually active, sex in last six months, condom use at last sex) between intervention and control group. Dose-effect analyses found that active participants had increased knowledge, but did not change their behaviour more than passive participants.

The limited effectiveness of this intervention parallels the problems identified in the literature review and meta-analysis. The intervention was confronted with implementation problems: in the second half of the intervention not all activities that were planned took place because of internal organizational problems. Furthermore, the intervention strongly focussed on individual determinants of sexual behaviour, perhaps neglecting other determinants of sexual behaviour. Finally, the use of peer educators as messengers was not fully supported by the students: they prefer receiving sexual health information from parents, teachers, health experts or through radio and television.

2.3. Study the possible reasons for the limited effectiveness

While the first two objectives demonstrated a rather limited effectiveness, the third objective aimed to identify and study more in-depth the possible reasons for this limited effectiveness of HIV prevention interventions for young people in sub-Saharan Africa. More specifically, we studied:

- the profile of active participants in interventions
- the determinants of sexual behaviour of young people
- the theoretical underpinnings of HIV prevention interventions

This objective mainly relied on studies taking place in Rwanda and on literature.

2.3.1. Limited participation in interventions

Participation in the intervention was assessed by identifying baseline characteristics of respondents that could serve as predictors of participation in the intervention. To that end, we applied multinomial and linear regression models with backward variable selection in Stata to the longitudinal data collected for the effectiveness evaluation. We studied participation in peer educator-initiated group activities and participant-initiated individual activities, as we hypothesized that the participants in both types of activities might differ. [19]

A large number of potential participants (40%) never participated in any intervention activity. Even in the relatively homogeneous population of school-going youth, participation differs depending on the type of activity. We distilled specific profiles of participants in group activities: multivariate analysis found that those at ease with their sexuality, those consciously seeking information, and those who seek to pass time, were more likely to participate in the intervention. For participation in individual activities no distinct profile could be defined, indicating that factors occurring during the intervention and not pre-intervention characteristics might be crucial.

Participation could be increased by organizing girls-only activities, investing in general wellbeing of young people (and not only in spreading HIV related information) and diversifying activities to attract a larger variety of participants.

2.3.2. Narrow focus on individual determinants of sexual behaviour

Another possible explanation of the limited effectiveness of HIV prevention interventions could be that the interventions do not address the right topics to make young people change their behaviour. Since sexuality and sexual relationships are inherently embedded in a social context, a thorough contextualized understanding of young people's perceptions on sex and relationships is essential for formulating effective SRH promotion interventions. However, few studies on sexuality of youth in Africa go beyond describing HIV risk related behaviours. We undertook two studies on determinants of young people's sexual health, focussing on different levels.

Firstly, we aimed to gain a thorough understanding of young Rwandans' perceptions on sexuality and relationships, by analysing the stories they spontaneously write about sexuality and relationships. This allowed us to identify factors that young people themselves indicate to be important in their sexual decision making and allows to analyse their particular vulnerability for HIV infection and poor sexual and reproductive health.

Secondly, focusing on the environmental level, we assessed the link between being out-of-school on the one hand and HIV status and risky sexual behaviour on the other hand, thereby uncovering the protective/hazardous effect of schooling for young people. This study aims to demonstrate the important role of structural level factors on young people's HIV status, sexual and reproductive health and sexual behaviour. To this end, we undertook a literature review of descriptive studies in East and Southern Africa.

Determinants of young people's sexual behaviour

To study the determinants of young people's sexual behaviour, we used a qualitative 'mailbox study' that assessed determinants of young people's sexual risk behaviour. This study assessed the spontaneous thoughts of Rwandan adolescents on sexuality, allowing us to identify crucial determinants of sexual risk behaviour. Mailboxes were installed in five secondary schools in Rwanda and students were invited to write about their ideas, secrets, wishes, desires and fears on sexuality and relationships. 154 relevant letters were collected. Analysis was done in NVivo. [20]

Letters written by Rwandan young people in the qualitative mailbox technique, revealed a large number of determinants of sexual behaviour, ranging from personal factors (e.g. puberty, knowledge) over inter-personal factors (e.g. type of sexual relationships) and environmental factors (e.g. school) to social and cultural factors (e.g. norms, economic factors, gender), demonstrating the complexity of sexual behaviour of young people. The letters found a dominance of two types of sexual relationships: experimental sex taking place unprepared among same-age youth and driven by sexual desire, and transactional sex, where young people have sex with an (often older) partner in exchange for money or goods and driven by peer pressure to possess the right material goods. While these types of relationships and contextual factors put young people at risk for HIV infection, they were not dealt with in the intervention. The letters also clearly demonstrated that the young people do not have the necessary capacity to deal with the risks occurring from these relationships: they do not receive adequate support from important adults (i.e. parents and teachers), they have limited general biological knowledge, and the health services are often stigmatizing towards young people. Furthermore, we found that a number of structural factors as gender, societal norms and economic factors strongly influence young people's sexual behaviour.

The role of structural factors: education

The important role of structural factors is further shown in a literature study on the role of education. We found that in-school youth have less HIV and demonstrated less risky sexual behaviour than out-of-school youth. Out-of-school youth was significantly associated with risky sexual behaviour, more precisely with early sexual debut, high levels of partner concurrency, transactional sex, age-mixing, low risk perception, a high lifetime number of partners, and inconsistent condom use. Being-in-school not only raises health literacy; the in-school (e.g., age-near) sexual network may also be protective, an effect which the better-studied (and regionally less significant) variable of educational attainment cannot measure.

2.3.3. *Insufficient theoretical underpinning of interventions*

One of the conclusions of our literature review and meta-analysis was that the observed limited effectiveness might stem from flaws in the assumptions underlying HIV risk reduction interventions. We undertook a study assessing the theoretical underpinnings of HIV prevention interventions for young people in sub-Saharan Africa. Using a

systematic literature, we assessed the theoretical underpinnings of existing HIV prevention interventions for young people in sub-Saharan Africa. [21]

Three behavioural theories were found to be at the basis of most interventions: social cognitive theory, theory of reasoned action/planned behaviour and health belief model. While such theories could provide guidance in simplifying this complex behaviour and in identifying key determinants, their focus remains on individual cognitions, such as HIV related knowledge and attitudes, simplifying sexual behaviour too much. To face the complexity of young people's sexual behaviour, interventions often resort to causal reductionism and simple, often (unconsciously) moralising messages. Thereby they ignore reality and the large amount of mutually influencing, multilevel, determinants of sexual behaviour.

3. Discussion and conclusion

Our studies observed little effectiveness of HIV prevention interventions for young people in sub-Saharan Africa. We discuss three groups of factors that may be accountable for this: the intervention, the implementation and the evaluation.

3.1. Factors related to the intervention

Interventions focus too much on cognitions on the individual level, ignoring other determinants of sexual behaviour, making it possible that they are doomed from the outset, simply because it is immensely difficult to alter individual's sexual behaviour in the presence of static community norms and social and cultural factors.

Sexual decisions depend on interlinked personal factors, partner characteristics, type of relationship, the proximate context (e.g. school, family) and the more distal social and cultural context (e.g. norms, gender, poverty) (Figure 2). Seen from an ecological viewpoint, it is clear that interventions mainly focusing on personal HIV knowledge, attitudes and skills can only have limited effects on sexual behaviour. Recognizing the complexity and heterogeneity of sexual behaviour, theory could provide guidance in simplifying this complex behaviour and in identifying key determinants. However, the implicit assumptions made by many HIV prevention interventions might simplify sexual behaviour too much.

Reducing sexual risk behaviour among young people is essential in reducing HIV incidence, however, the extent to which changes in sexual behaviour are reflected in changes in HIV incidence also depends upon relational and contextual factors. Otherwise put, the same behaviour does not result in the same risk for HIV infection in every relationship or context. In order to have a high impact, interventions should focus on the most risky behaviour(s) of their target population, and its dominant predictors, and should consider the position of the target population within the dynamic sexual network through which HIV is spread [22].

By analysing existing data on the determinants of this complex behaviour and their pathways, and by gathering additional information, researchers should make unprecedented efforts to develop more effective interventions. Interventions should be popula-

tion- and context-specific, requiring renewed attention to the first phase of intervention planning: the situation analysis and needs assessment.

3.2. Factors related to the implementation

The observed limited effectiveness of HIV prevention interventions for young people in sub-Saharan Africa is not responded to by extensive (published) process evaluations. Little is known about the implementation quality of interventions; in evaluation studies, implementation aspects are rarely or concisely reported upon. Scientific papers reporting uniquely on the implementation of interventions are even rarer; it seems that only large trials and study groups can afford to invest extensively in evaluating the process of developing and implementing HIV prevention interventions [7]. Furthermore, process evaluations are more difficult to get published in scientific journals than outcome evaluations – while only one journal is specifically focused on implementation science for health interventions, a large number of journals are interested in outcome evaluations of health interventions. The limited word count that applies to most journals hinders that both evaluation types are presented together.

Monitoring interventions is essential in understanding their effectiveness. Evaluators, intervention managers and scientific journal editors should become aware of the importance of making the processes of intervention development and implementation publicly accessible, in order for others to learn from successes and failures.

3.3. Factors related to the evaluation

While we identified several flaws in intervention design and implementation, that may explain the observed limited effectiveness of HIV prevention interventions for young people in sub-Saharan Africa, UNAIDS data report that “young people are leading the HIV prevention revolution” and that reductions in HIV prevalence coincide with changes in sexual behaviour among young people. Therefore, we cannot exclude that interventions do have an effect on young people’s sexual behaviour, but that evaluations do not succeed in demonstrating this effect.

An overview of evaluations of HIV prevention interventions for young people in sub-Saharan Africa demonstrates few commonalities in study design, perhaps suggesting that there is little consensus on the optimal approach and that few studies have built upon previous knowledge in a linear way.

Randomized controlled trials are considered the gold standard for determining cause-and-effect relationships. However, their use in measuring the effectiveness of HIV prevention interventions on sexual behaviour is often compromised by the complexity of the real life situation in which these interventions take place. The long causal pathway in changing sexual behaviour and the multitude of influencing contextual factors hinder evaluators to assign changes to the intervention. While the ultimate objective of the interventions is to reduce HIV incidence among young people, this is difficult to assess due to the large sample size necessary to measure changes in HIV incidence. An additional challenge of evaluation studies, not only (c)RCTs, is making sure the evaluation is suf-

ficiently powerful. Problems with the correct use of evaluation designs might lead to false conclusions, while insufficiently powered evaluations or short-term measurements may hide actual effects.

Even though (c)RCTs are still considered by many to be “the cornerstone of the evidence needed to support implementation of HIV prevention programmes” [29] and “will remain the most rigorous and convincing intervention study design” [30], we follow Laga [31] when she “advocates for realism and pragmatism when it comes to generating more convincing evidence to guide prevention programming” and proposes “plausibility designs” as an alternative.

Furthermore, we argue that the indicators currently used to measure this sexual risk behaviour are not a correct reflection of the actual risk taken, since they are taken out of the context of the relationship and network in which they take place. It is possible that interventions do change sexual behaviour, but that these changes are not observed due to flaws in the evaluation design and indicators used.

Alternative evaluation designs should be formulated, combining different evaluation approaches mirroring the intervention process (“combination evaluation”), and studying plausibility of effectiveness, rather than probability. In order to adequately measure sexual risk, composite contextualized indicators have to be developed combining aspects of transmission (including relational characteristics), exposure and infectiousness.

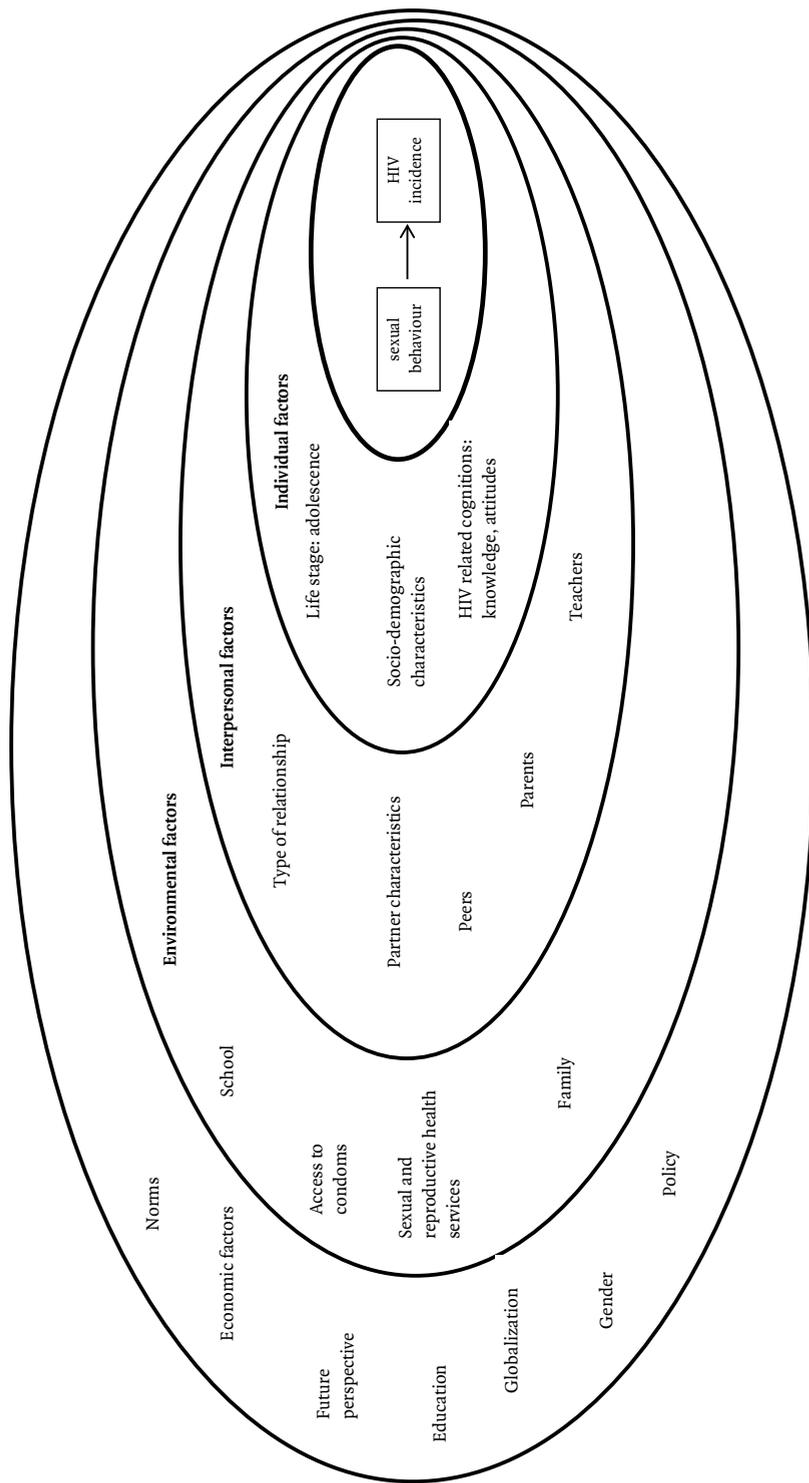


Figure 2: Determinants of sexual behaviour of young people identified in this doctoral research study

3.4. Conclusion

These conclusions and recommendations mainly affect five parties: researchers, intervention managers, evaluators, funders and scientific journal editors. Given the absence of a vaccine or a cure, the focus remains on preventing HIV transmission. By analysing existing data on the determinants of the complex sexual behaviour of young people and their causal pathways, and by gathering additional information, researchers should make unprecedented efforts to develop alternative and more effective interventions. Accepting the complexity of sexual behaviour of young people, also means dealing with a considerable degree of uncertainty and flexibility. Intervention development, implementation and evaluation are to be considered inseparable: results of effectiveness evaluations should be considered of little use if no information is provided on the intervention or its implementation and vice versa. Since the evaluation should be an integral part of the intervention, intervention managers and evaluators need to work in close collaboration, without suspicion. Donors have to accept that a complex intervention cannot be designed beforehand, but requires a process approach that maps risky behaviours, dominant predictors, causal pathways and key stakeholders. This pre-intervention research should be considered a fundamental part of the intervention and donors should be aware that effectiveness depends on this phase, hence funding should be made available. In this process, reality, and not morality, should be at the forefront: young people should be approached as responsible individuals who are able to make their own decisions and need to be made competent to ensure their choice to (not) have sexual intercourse is made autonomous, without coercion or regret and with the necessary in-depth knowledge of risks. This requires a change in attitudes of all stakeholders involved. A complex intervention approach also means that the intervention is monitored and can be changed during its course, resulting in the need for flexible, mixed and triangulated evaluation approaches (“combination evaluation”) and flexible funding strategies. Scientific journals have the responsibility to make innovative approaches public, even though they might not be considered most rigorous by current scientific standards, as well as allow for elaborate reports on intervention development and implementation. We are convinced this can be done if all parties remain conscious of the ultimate objective; eradicating HIV among the important and vulnerable population of young people.

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