

## Review Article

# HIV Prevention among Young People in Sub-Saharan Africa

Njemkerk EN<sup>1,4</sup>; Samje M<sup>2</sup>; Atanga MBS<sup>3</sup><sup>1</sup>Department of Public Health, Faculty of Health Sciences University of Bamenda, Cameroon<sup>2</sup> Department of Biomedical Sciences, Faculty of Health Sciences, University of Bamenda, Cameroon<sup>3</sup> Department of Nursing, Faculty of Health Sciences, University of Bamenda, Cameroon<sup>4</sup> Cameroon Baptist Convention Health Services (CBCHS), Cameroon

\*Corresponding author: Njemkerk Edith Ngonwei

Department of Public Health, Faculty of Health Sciences, University of Bamenda, Cameroon, PO Box 39 Bambili, Cameroon.

Tel: +237675019407, +23767115962

Email: edithk2020edith@gmail.com

Received: November 10, 2023

Accepted: December 28, 2023

Published: January 02, 2024

## Background

In 2019, worldwide, two out of every seven new HIV infections were among young people [1]. In 2020, an estimated 400 000 and 150 000 youths aged 15–24 years and adolescents 10–19 years newly acquired HIV worldwide respectively. Among which 4,200 new HIV infections occur weekly, with adolescent girls and young women at higher risk of being infected. This dis-

## Abstract

**Purpose:** The commitment to getting to epidemic control by 2030, places the prevention of Human Immune Virus at the center of the response. With the disease affecting young people disproportionately, reducing HIV infections among this group is vital. This paper seeks to review data on the different types of interventions used in the prevention of HIV amongst young people in Sub-Saharan Africa.

**Method:** Data search was done by reviewing journals through PubMed and Google scholar.

**Findings:** Reviews found that school based approach improved on knowledge, attitude and reduced risky sexual behaviors among young people. Adolescent-responsive strategy was seen to be effective, sustainable and scalable. The percentage of condom use increased from 32% to 45% for females ( $p < .05$ ) and from 44% to 61% for males ( $p < .01$ ) with regular partners among Cameroonian youths. Condom use among sexually active students decreased from 61% in 2009 to 54% in 2019. HIV testing had low rates among young people. Oral PrEP demonstrated over 90% risk reduction of HIV. Circumcised men had a 60% HIV protection effect and cash transfers reduced HIV risk significantly among adolescent girls and young women with positive behavioral outcomes.

**Conclusion:** HIV prevention approaches when integrated can achieve maximum effectiveness, but it's important for these interventions to be tailored towards meeting the needs of young people. Knowing that they have unique developmental needs and challenges, prevention programs should be contextualized depending on the geographical location and environment to meet specific needs.

**Keywords:** Young people; HIV; AIDS; Prevention; Intervention

**Abbreviations:** AIDS: Acquired Immune Deficiency Virus; AGYW: Adolescent girls and young women; ARCS: Adolescent-Responsive Contraceptive Strategy; AYFSRHS: Adolescent and Youth Friendly Sexual and Reproductive Health Services; CDC: Center for Disease Control; ESAR: Eastern and Southern African Region; HIV: Human immune Virus; Oral prep: Oral pre exposure Prophylaxis; PwP: Prevention With Positives; SRH: Sexual and Reproductive Health; SRHS: Sexual and Reproductive Health Services; SSA: Sub Saharan Africa; VCT: Voluntary Counseling and Testing; VMMC: Voluntary Male Medical Circumcision

Austin Journal of Public Health and Epidemiology-  
Volume 11, Issue 1 (2023)[www.austinpublishinggroup.com](http://www.austinpublishinggroup.com)

Njemkerk EN © All rights are reserved

**Citation:** Njemkerk EN, Samje M, Atanga MBS. HIV Prevention among Young People in Sub-Saharan Africa. Austin J Public Health Epidemiol. 2024; 11(1): 1155.

in the past 12 months and received the result of the last test [2]. An estimated 67% of the 38.4 million people living with HIV (PLWH) globally in 2021 were from SSA. This region was responsible for 670,000 of the 1.5 million new infections and 280,000 of the 650,000 AIDS-related deaths reported in 2021 worldwide [2,3].

In 2022, 480,000 [255,000-760,000] young people between the ages of 10 to 24 were newly infected with HIV, of whom 140,000 [35,000-250,000] were adolescents between the ages of 10 and 19. It is projected that there will be some 183,000 annual new HIV infections among adolescents in 2030 [4,5]. Adolescents account for about 4 per cent of all people living with HIV and about 10 per cent of new adult HIV infections. About 1.40 million [1.00 million-1.85 million] or 85 per cent, live in sub-Saharan Africa [4,6].

Also, in 2022, adolescent girls accounted for four fifths of all new HIV infections among adolescents and almost six times as many adolescent girls were newly infected with HIV than adolescent boys in SSA same year, due to both physiological and cultural reasons [7]. In SSA, 6 in 7 new HIV infections among adolescents aged 15–19 years are girls. Young women aged 15–24 years are twice likely to be living with HIV than their male counterparts [2,8]. More boys are newly infected with HIV yearly in East Asia and the Pacific, than girls in adolescence thus reflecting differences in risk behavior across regions, meaning interventions must be tailored to the specific needs [4].

Only one third of young people have a comprehensive HIV knowledge, with lower levels of knowledge among young women compared to young men [2,4]. The disproportionately high HIV prevalence among this group throughout the region suggest the lack of appropriate interventions to protect young women and men, and to meet their sexual and reproductive health needs as they prepare for adulthood [9].

Though a high number of young people are living with HIV, insufficient attention is given to prevent future HIV transmission while those living with HIV suffer from significant stigma and discrimination [10]. Given that there is no available cure or vaccine yet, and that about 90% of HIV infection is sexually transmitted, reducing risky sexual behavior among other preventive measures is crucial in tackling the epidemic among this group [11]. Due to its high prevalence in SSA, success in prevention intervention has the potential to impact the global burden of HIV [12].

Therefore to achieve epidemic control by 2030, a comprehensive well-tailored, age appropriate information and knowledge, with positive attitudes are key in the prevention and control of HIV amongst this group of persons [13-15]. This entails working with young people in a comprehensive way; including working with schools, job generation activities, health systems, sports clubs and reproductive health programs. These, to ensure that young people have the required knowledge needed in the prevention of new HIV infections and other STIs [1]. According by Pettifor A, *et al* (2015), addressing HIV epidemic among young people will entail interventions that are integrated. He further found that Behavioral interventions alone have demonstrated limited efficacy in reducing HIV incidence among these group [16,17].

This study therefore seeks to review the different HIV preventive methods used among young people in Sub Saharan Africa.

## HIV Prevention Interventions

**Behavioral Strategies in the prevention of HIV:** This involves increasing knowledge on how to protect self from being infected with HIV, reducing stigma, encouraging access to services and improving attitudes toward safer sexual practices [18-21]. This is achieved using a range of educational, motivational, peer-led, facility led, skill-building as well as community and school led approaches [19,22].

**Education and counseling:** Sexual education and counseling are one of the most effective prevention strategies for HIV/AIDS among young people. It empowers them with accurate and comprehensive information about sex and sexuality, including HIV/AIDS prevention methods [23]. Age-appropriate, culturally sensitive information enables them to make informed choice concerning knowing their HIV status through Voluntary Counseling and Testing (VCT) [24]. HIV prevention counseling is concentrated on promoting sexual behaviors that minimizes the risk of contracting HIV and exposes the young person with an opportunity to get tested [25].

**School Based HIV Prevention Approach:** Evidence shows that school-based sexuality education can be effective in changing the knowledge, attitudes and practices that lead to risky sexual behavior [26]. In countries with generalized epidemics, schools can be a critical venue for reaching adolescents with the information and skills they need to avoid HIV infection [26,27]. A review of risk and protective factors for ASRH in low- and middle-income countries found that adolescents who attend school are less likely to have sex compared with those who leave school early [28]. Another review from eastern, southern, and central Africa found that secondary education is strongly associated with decreased HIV rates and the reduction of risky sexual behaviors. Thus concluding that, education empowers young people in their sexual relationships and practice of safer sex [7]. Schools are a great avenue for HIV prevention education because, the young people attend educative sessions regularly, and most of them prior to onset of sexual activities. These lessons learnt affect their lifelong norms, attitudes and behaviors in adult life [22].

In a review of 23 studies by Sue M.*et al* 2011, they found out that School-based, adult-led, curriculum-based interventions showed clear evidence of reducing risky sexual behavior [29]. Douglas K.*et al* 2006, in a review evaluated 17 curriculums and 5 non-curriculum based interventions and findings revealed that 16 of the 22 interventions significantly delayed sex, reduced the frequency of sex, decreased the number of sexual partners, increased either the use of condoms or contraceptives or reduced the incidence of unprotected sex among young people. They also saw that of the 17 curriculum-based interventions, 13 were taught by adults and 11 significantly improved one or more reported sexual behaviors. Among these 13 studies, interventions led by both teachers and other adults had strong evidence of positive impact on reported behavior. Of the 5 non-curriculum-based interventions, 2 of 4 adult-led and the 1 peer-led intervention improved one or more sexual behaviors [30]. From the above findings it was seen that a large majority of school-based sex education and HIV education interventions reduced reported risky sexual behaviors in developing countries. There was also evidence of curriculum-based interventions led by either teachers or adults being the most effective interventions thus commended to be implemented more widely [30,31]. Other related reviews suggest school and community-based prevention programs for adolescents and youths as an effective way in de-

laying sexual activity, HIV-related preventative behaviors, adolescent pregnancy, and STIs. It was also seen that simply staying in school had positive effects on sexual and reproductive health outcomes [32].

From a Randomized trial conducted by Ross *et al.* (2007) in Tanzania on assessing the impact of Biological and behavioral interventions on adolescent sexual health. Significant impact was seen especially in boys on improved knowledge, attitudes on sexually transmitted infection symptoms, and several behavioral outcomes. In the study only five HIV sero-conversions occurred in boys, whereas in girls the adjusted rate ratio (intervention versus comparison) was 0.75 [95% Confidence Interval (CI) 0.34, 1.66]. The intervention substantially improved behavioral outcomes but had no consistent impact on biological outcomes within the 3-year trial period [33]. Jewkes *et al.* 2008 in a Cluster Randomized Controlled Trial, also reported changes in behavior over time on Youth aged 15–26 years in South Africa [34].

**Facility-led Youth and adolescent friendly Sexual and Reproductive Health Services (AYFSRHS):** Sexual and Reproductive Health (SRH) and HIV are closely linked with clear advantages in connecting them at policy, programmatic and service delivery levels [35]. HIV infection is primarily sexually transmitted with about 90% transmission rate, thus SRH programs are of utmost importance in the prevention of HIV [36,37]. Chaltu *et al* (2022), in a cross sectional study found out that one-in-four secondary school adolescents utilized SRH services [37]. There is therefore the need for SRHS to become friendly for easy access by young people. A services where they will not be called names and stigmatized for seeking such services. There are strong evidences of the efficacy of several HIV prevention interventions delivered by health services. However, these specific interventions cannot have any direct effect on the HIV epidemic unless they are accessible and acceptable to, and used by, young people [38]. According to Sue M. *et al* (2011), Interventions in health facilities increased the use of services when made accessible and more youth-friendly [39]. Therefore for SRHS to be accessible to young people there is the need for the appropriate human resources made available and the services friendly to meet the specific needs of the young people.

**Adolescent-responsive strategy:** There is evidence that adolescent-friendly services, when well-designed and well-implemented, can help increase access to and use by young people, but sustenance and scalability is a major challenge [40]. Adolescent-Responsive Contraceptive Services (ARCS) is therefore emerging as a more scalable and sustainable way to meet adolescents' needs for contraceptive information and services. This signals an evolution from traditional stand-alone models of adolescent-friendly services towards a systems approach to making existing contraceptive services adolescent-responsive [41,42]. ARCS entails applying a systems approach to make existing contraceptive services responsive to the needs and preferences of young people. This is achieved through incorporating evidence-based elements in all the components of the health system, rather than implementing isolated interventions. This ensures that policies, procedures and programs are adopted to respond to the diverse needs of young persons across the health system [43]. This approach is necessary to address the multiple barriers to young peoples' access and use of SRH services. These barriers include, laws and policies, gender and social norms, misconceptions and lack of knowledge, financial barriers, lack of privacy and confidentiality and provider bias. Lessons learnt from Chile, Ethiopia, and Uruguay implementation shows that

when this approach is intentionally and systematically applied across the health system, there is strengthening of the system and quality services are sustained. This involves an ensured enabling policy and legal environment for contraceptive provision to young people, collaborating with other sectors and channels to reach different youths and adolescent segments for service delivery and improve providers' competency in providing youth adolescent responsive contraceptive services [43].

**Prevention with Positives (PwP):** Usually when discussing HIV prevention, the generality is on protecting individuals from becoming infected with the virus. Prevention with positives is an intervention that addresses the specific needs of HIV positive persons and prevention of new infections [44]. This embraces the concept of individuals who have been tested positive for HIV and are helped to avoid spreading the infection. It also recognizes the fact that infected individuals may have SRH goals and should be achieved with minimal harm to others [22]. The availability of ARVs which extends and improve quality of life for infected young people makes this achievable. As such young people living with HIV/AIDS are encouraged to learn more on their serological status, access and adhere to treatment leading to viral suppression [45,19,46]. This reduction in HIV viral load reduces mortality and morbidity among infected young people, reduces infectiousness and also susceptibility for the non-infected partner [22]. A 12 months follow up study conducted by Carol Dawson Rose *et al* (2012), on 'Messages HIV clinicians use in prevention with positives interventions', found that there was a significant increase in the percent of patients receiving all PwP counseling messages ( $p < 0.01$ ). Providers also reported discussing safer sex with 91% of patients during screening for Sexually Transmitted Infections (STIs) each visit, an increase from baseline (83.5%). In conclusion it was seen that in order for HIV care providers to incorporate HIV prevention discussions into their practice, acceptable approaches to speaking about risk behavior and prevention of HIV transmission must be developed [47]. With the knowledge that HIV positive persons live with both the experience of being infected and the responsibility of knowing that they can infect others, prevention strategies for HIV positive persons can go a long way to address the complexity of this responsibility. This can be done through HIV education and skills-building interventions, counseling and emotional support, disclosure support, and testing and services for partners of HIV positive persons [44].

#### Barrier Methods

**Condom Use:** The male condom is a long-standing biomedical preventive tool known as one of the cornerstones of HIV prevention programs from the beginning of the epidemic. When used consistently it has 95% effectiveness in reducing HIV transmission. Correct and consistent use of condoms is one of the key behavioural HIV prevention interventions that not only limits spread of Sexually Transmitted Infections (STIs), including HIV, but also prevents unwanted pregnancy [48]. According to CDC (2022), Condom use among sexually active students decreased from 61% in 2009 to 54% in 2019, presenting a serious health risk for HIV and STDs. Addressing HIV in young people therefore requires providing them with the skills they need to reduce risk, make healthy decisions, and get treatment and care if needed [49,50]. In a study conducted in Cameroon, Meeker D. *et al.* (2005), found that during the condom social marketing campaign ("100%" Jeune) in Cameroon, the percentage of youth who used a condom with their regular partner increased from 32% to 45% for females ( $p < .05$ ) and from 44% to 61% for

males ( $p < .01$ ) [51]. This findings shows that the intervention was more effective among the males than females. It was a two year intervention which stopped there after not giving room for scale up to ensure behavior change among this group. Increase condom use among males than females was also concurred by Michielsen, Kristien *et al* (2010) in a systematic review [52]. In a randomized controlled trial of group (LifeSkills) that delivered HIV prevention intervention for transgender young women, Garofalo *et al* (2018), [53] found that there was a demonstrated 40% reduction in condom less sex. The success of LifeSkills makes it the first behavioral HIV prevention intervention specifically designed for transgender youth that showed efficacy [54].

**Biomedical HIV Prevention Interventions:** The Centers for Disease Control and Prevention (CDC) defines biomedical HIV interventions as medical, clinical, and public health approaches that moderates biological and physiological factors in the prevention of HIV, reduce susceptibility to HIV and decrease HIV infectiousness [54,55]. Though most research on biomedical interventions has been conducted with adults [56-58], there are currently a range of effective biomedical approaches like rapid HIV testing, oral PrEP and Voluntary medical male circumcision that can be integrated into prevention package of young people [54].

**HIV testing:** One-third of the population of sub-Saharan Africa is between the ages of 10-24 years [59]. Young people are more likely to engage in risky sexual behaviors than older adults and have less contact with the healthcare system. Control of HIV in this category of persons though challenging, is critical for epidemic control [60]. Although HIV testing is one of the entryway to accessing biomedical prevention, there still exist very low testing rates among adolescents and youths, irrespective of the increase access to rapid and affordable HIV testing in recent years [61,62]. In Sub-Saharan Africa, where the majority of young people living with HIV reside, only one in five HIV-positive adolescent girls know their HIV status [62]. In other to reach-out to this group of persons, it is imperative for testing modalities to move to those at highest risk, through mobile clinics, household and venue-based testing. HIV self-testing though not highly acceptable in a number of settings offers young people a private and convenient way to access testing [54]. Cameroon recently adopted guidelines for the implementation of Human immune virus Self-Testing (HIVST). According by YAGAI BOUBA *et al* 2023, HIVST is used among the less reached adolescents population as one of the innovative strategies to reach the national goal. Within the study period, a significant number (18415) of young people <25years were tested. They concluded that HIVST using M1, M2 & M5 distribution models is an effective testing strategy in Cameroon (Antenatal, postnatal, and maternal and child clinics (ANC/PNC/MCH) (M1); (ii) Partners of other HIV+ (M2); (iii) Workplace (M3); (iv) Community (M4); and (v) HIV testing services (HTS) (M5)) [63].

**Oral PrEP:** Based on two randomized clinical trials, the U.S. Food and Drug Administration (FDA) in 2012, approved once daily emtricitabine and tenofovir (TDF/FTC; Truvada®) as oral PrEP for HIV prevention in adult [54]. In a study conducted by Craig J. *et al* 2022 in Kenya among AGYW, It was seen that though most of the participants were eligible for PrEP due to their inconsistency with condom use, violence survivorship or sexually transmitted infection symptoms, PrEP use was sub-optimal. Rather Adolescent Girls (AG) who used PEP (post-exposure prophylaxis) reported more consultations (aPR = 5.63 [3.53–8.97]) among which Young Women (YW), transactional

sex engagers reported more consultations (58.62% vs. 39.09%, PR = 1.50 [1.06–2.12]). Though most AGYW were PrEP-eligible, PrEP consultations were rare and differed by age and vulnerability [64].

This is concurred by a report by UNAIDS which states the PrEP reduces HIV by up to 90% when taken correctly with good adherence. Also PrEP has been shown to prevent HIV among gay men and other men who have sex with men, transgender people, heterosexual men and women and people who inject drugs [65,66]. Thus it can be seen that OralPrEP as a preventive measure is very effective but more acceptable by the priority populating of young people.

**Voluntary Medical Male Circumcision (VMMC):** According by Megan E, *et al* (2023), VMMC is associated with an estimated 60% reduction in the risk of transmission of HIV from female to male [67]. Notably, VMMC has been one of the recommended component of HIV prevention packages by the WHO since 2007 with the goal of increasing coverage among males ages 10–29 to 90% [38,68]. VMMC remains a key pillar of combination HIV prevention. Mathematical modelling has shown that it is cost-effective, and even cost-saving [69].

**Structural HIV Prevention Interventions:** The elements that are involved in structural prevention of HIV are defined as “physical, social, political, cultural, organizational, community, economic and legal, or policy. These aspects either facilitate or obstruct efforts to prevent HIV infection” [70,71]. Structural drivers of HIV infection that put adolescents at high risk of HIV infection include; poverty, limited sexual and reproductive health education, unemployment, food insecurity, violence, stigma and discrimination [56,70]. These don't only increase the risk of HIV infection but also limit access to preventive health care services [54]. Cash transfer has been one of the most effective structural strategies in the prevention of HIV among young people.

**Cash Transfer:** HPTN 068, was one of the first recent trials conducted to examine the role of cash transfer (the case of poverty) in reducing the risk of HIV transmission among SSA young women. In this trial no direct impact on HIV incidence was found but there was significant reductions in physical violence from partner and reductions in unprotected sex and number of sexual partners [72]. A trial conducted in Malawi found that cash transfer provided to AGYW and their parent/guardian resulted in lower HIV incidence. There was also the less likelihood of having an older sexual partner and reduction in frequent sex in the intervention arm compared to the control group [73]. Audrey Pettifor *et al* 2016, in a randomized control trail after adjusting for age, found that all levels were associated with an increased odds of HIV infection with partner-level factors conveying the strongest association (OR 3.05 95% CI 1.84-5.06) [74].

Additionally, observational studies found a positive effect of large, government cash transfer programs on adolescent HIV risk behavior. Adolescents living in homes receiving the transfer were observed to less likely engage in transactional sex and having an older partner and more likely to delay coital debut [75]. According to Lucie Cluver (2013) there was reduction in the incidence of transactional sex among adolescent girls (n=1926) with an Odd Ratio (OR) of 0.49, 95% CI 0.26–0.93;  $p=0.028$ , and age-disparate sex (OR 0.29, 95% CI 0.13–0.67;  $p=0.004$ ), with similar associations for prevalence (for transactional sex, OR 0.47, 95% CI 0.26–0.86;  $p=0.015$ ; for age-disparate sex, OR 0.37, 95% CI 0.18–0.77;  $p=0.003$ ) [76].

Due to the effectiveness of this strategy a number of cash transfer programs are being carried out in SSA countries targeting mostly AGYW. DREAMS program, a preventive program by PEPFAR aimed at reducing HIV among AGYW in 10 countries in Africa including Uganda has cash transfer programs as part of a larger combination prevention program in some of the countries [77]. In Cape Town South Africa, the Global Fund is providing funding for “Women of Worth” cash plus intervention trial to reduce HIV risk among AGYW [78] and UNICEF is conducting an evaluation of cash plus intervention among adolescents in Tanzania [79,80]. A randomized controlled trial that rewarded young people in Tanzania (Rewarding STI Prevention and Control in Tanzania study) who managed to stay free from STIs with conditional cash transfer recorded a reduced STI incidence after 1 year [81]. It can therefore be seen that the aspect of poverty can influence young people negatively in involving themselves into risky sexual behaviors not because they like it but as a means of surviving thus leading to HIV infection. It is therefore important of policies to be reviewed giving opportunity for employment and other benefits among this group.

Structural barriers to accessing care by young people such as lack of youth friendly SRH facilities need to be addressed in other to attract and retain youth in care [82]. Health facilities that are successful in making services more adolescent responsive have consistently included provider training and community activities [82]. There is therefore a great urgency to develop evidence base effective structural interventions for HIV prevention among young people.

### Conclusion

Young people are at the center of the HIV epidemic, yet have historically been peripherally included in the response. They are the most vulnerable due to lack of Knowledge, life skills, financial autonomy, limited access to sexual health services. This could be due to social, cultural, economic and biological reasons. Young women have the highest HIV incidence rates in SSA thus scaling up known efficacious HIV prevention strategies targeting this group are of utmost priority. HIV prevention has generally been targeted at HIV-negative individuals. It has been seen that involving HIV positive persons in preventive strategies help create awareness in them and makes them take responsibility in their health and the health of other. It is therefore of utmost importance for HIV prevention efforts to shift from a narrow focus on HIV-uninfected persons to include both HIV-negative and HIV-positive individuals.

Given that a single HIV prevention intervention is unlikely to be able to alter the epidemic path, and that each intervention overlap with the other, there is need to provide combination prevention strategies. This is also buttressed by the fact that HIV epidemics in the different communities or regions are complex and comprises of different risk factors. Thus a blend of behavioral, biomedical and structural HIV prevention options is needed to alter the course of the HIV epidemic among this group of persons. From the review, adult-led school based, curriculum-base and adolescent responsive interventions have been seen to reduce stigma, improve knowledge and reduce risky sexual behaviors. Also, Interventions in health facilities have been seen to increase the use of SRHS by young people when made accessible and more youth-friendly. Because AYF-SRHS are associated with the challenge of sustaining and scaling up the activity, adolescent responsive strategy may be considered since it involves the entire health system and its activities are integrated into the health facility. It is therefore important

for the government to consider including sexual and reproductive health education into the school curriculum, develop adolescents and youth friendly sexual and reproductive health services using the adolescent responsive strategy among other intervention as a means of preventing HIV and contributing to epidemic control by 2030.

### References

- UNAIDS. Young people and HIV. UNAIDS. 2021.
- SRA 3. HIV prevention among young people. Geneva: UNAIDS. 2022.
- Moyo E. Perseverance Moyo, Grant Murewanhema, Malizgani Mhango, Itai Chitungo, Tafadzwa Dzinamarira. Key populations and Sub-Saharan Africa's HIV response. *Front Public Health*. 2023; 11.
- UNICEF. Adolescent HIV prevention. [cited Aug 25 2023]. united nations children's fund; 2023.
- WHO. HIV and AIDS. GENEVA: WHO. 2023.
- UNAIDS. Danger: UNAIDS global AIDS update 2022. UNAIDS. 2022.
- Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: A framework and promising approaches. *J Adolesc Health*. 2015; 56: S7-14.
- Murewanhema G, Musuka G. Perseverance Moyo, Enos Moyo, Tafadzwa Dzinamarira. HIV and adolescent girls and young women in sub-Saharan Africa: A call for expedited action to reduce new infections. *Zimbabwe: IJID regions*. 2022; 5.
- UNAIDS. The Gap report. UNAIDS. 2014.
- Interagency task team (IATT) on HIV and young people, global guidance brief: HIV interventions for young people. New York: United Nations Fund for Population Activities. 2008.
- Michielsen K, Temmerman M, Van Rossem R. Limited effectiveness of HIV prevention for young people in sub-Saharan Africa: studying the role of intervention and evaluation. *Facts Views Vis Obgyn*. 2013; 5: 196-208.
- Kharsany ABM, Karim QA. HIV infection and AIDS in sub-Saharan Africa: current status, challenges and opportunities. *Open AIDS J*. 2016; 10: 34-48.
- Nji KE, Nsagha DS, Siysi VV, Eno orock GE, Ngowe Ngowe Marcelin. Knowledge and attitude regarding HIV/AIDS and universal testing and treatment strategy in some selected communities in Fako health districts of Cameroon. *J Environ Sci Public Health*. 2020; 4.
- Wellings K, Collumbien M, Slaymaker E, Singh S, Hodges Z, Patel D, et al. Sexual behaviour in context: a global perspective. *Lancet*. 2006; 368: 1706-28.
- UNFPA. Why focus on Young People. United nations population fund. 2008.
- Pettifor A, Nguyen NL, Celum C, Cowan FM, Go V, Hightow-Weidman L. Tailored combination prevention packages and PrEP for young key populations. *J Int AIDS Soc*. February 2015; 18: 19434.
- Pettifor A, Stoner M, Pike C, Bekker LG. Adolescent lives matter preventing HIV in adolescents. *Curr Opin HIV Aids*. 2018; 13: 265-73.
- Valdiserri RO, Ogden LL, McCray E. Accomplishments in HIV prevention science: implications for stemming the epidemic. *Nat Med*. 2003; 9: 881-6.

19. Coates TJ, Richter L, Caceres C. Behavioural strategies to reduce HIV transmission: how to make them work better. *Lancet*. 2008; 372: 669-84.
20. People, UNAIDS Interagency Task Team on Young. Preventing HIV/AIDS in young people, A SYSTEMATIC REVIEW OF THE EVIDENCE from DEVELOPING COUNTRIES. WHO. 2006.
21. Semaan S, Kay L, Strouse D, Sogolow E, Mullen PD, Neumann MS, et al. A profile of U.S.-based trials of behavioural and social interventions for HIV risk reduction. *J Acquir Immune Defic Syndr*. 2002; 30: S30-50.
22. Bekker L-G, Beyrer C, Quinn TC. Behavioral and biomedical combination strategies for HIV prevention. *Cold Spring Harb Perspect Med*. 2012; 2 .
23. Globe HOPE. Across the. HIV/AIDS and youth: prevention and education strategies. Hope Across Globe. 2023.
24. UNFPA. Intergrating HIV voluntary Counselling and Testiong into Reproductive Health settings. united nations population fund. ISBN: 0-89714-690-5; 2004.
25. Hallett TB, Dube S, Cremin I, Lopman B, Mahomva A, Ncube G, et al. The role of testing and counselling for HIV prevention and care in the era of scaling-up antiretroviral therapy. *Epidemics*. 2009; 1: 77-82.
26. UNICEF. Adolescent HIV prevention. united nations children's fund. 2022.
27. Marge B. HIV/AIDS, sexual and reproductive health:intimately related. *Int J Sex Reprod Health Rights*. 2003; 11: 6-11.
28. Mmari K, Sabherwal S. A Review of risk and protective factors for adolescent sexual and reproductive health in developing countries: an update. *J Adolesc Health*. 2013; 53: 562-72.
29. Mavedzenge SN, Doyle A, Ross D. HIV prevention in young people in sub-Saharan Africa: A Systematic Review. *J Adolesc Health*. 2010; 49: 568-86.
30. Kirby D, Obasi A, Laris BA. The effectiveness of sex education and HIV education interventions in schools in developing countries. *World Health Organ Tech Rep Ser*. 2006; 938: 103-50.
31. Mcleod S. Albert Bandura's Social Learning Theory. s.l.: Reviewed by Olivia Guy-Evans. 2023.
32. Mason-Jones AJ, Sinclair D, Mathews C, Kagee A, Hillman A, Lombard C. School-based interventions for preventing HIV, sexually transmitted infections, and pregnancy in adolescents [review]. *Cochrane Database Syst Rev*. 2016; 11: CD006417.
33. Ross DA, Chagalucha J, Obasi AI, Todd J, Plummer ML, Cleophas-Mazige B, et al. Biological and behavioral impact of an adolescent sexual health intervention in Tanzania: Acommunity-randomized trial. *AIDS*. 2007; 21: 1943-55.
34. Jewkes R, Nduna M, Levin J, Jama N, Dunkle K, Puren A, et al. Impact of stepping stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised controlled trial. *BMJ*. 2008; 337: a506.
35. WHO. Sexual and reproductive health and rights (SRHR) and HIV. GENEVA: WHO; 2023.
36. Askew I, Berer M. The contribution of sexual and reproductive health services to the fight against HIV/AIDS: a review. *Reprod Health Matters*. 2003; 11: 51-73.
37. Abdurahman C, Oljira L, Hailu S, Mengesha MM. Sexual and reproductive health services utilization and associated factors among adolescents attending secondary schools. *Reprod Health*. 2022; 19: 161.
38. WHO. Preventing HIV through safe voluntary medical male circumcision for adolescent boys and men in generalized epidemics: recommendations and key considerations. GENEVA: WHO. 2020.
39. Napierala Mavedzenge SM, Doyle AM, Ross DA. HIV prevention in young people in sub-Saharan Africa: A Systematic Review. *J Adolesc Health*. 2011; 49: 568-86.
40. Brittain AW, Briceno ACL, Pazol K, Zapata LB, Decker E, Rollison JM, et al. Youth-friendly family planning services for young people: A systematic review update. s.l. *Am J Prev Med*. 2018; 55: 725-35.
41. Catino J, Battistini E, Babcheck A, People Y. Advancing sexual and reproductive health: toward a new normal. Seattle: YIELD Project. 2019.
42. World Health Organization. Global standards for quality health-care services for adolescents. A guide to implement a standards-driven approach to improve the quality of health care services for adolescents. Geneva: WHO. 2015.
43. FP3030. HIGH-IMPACT PRACTICES:adolescent-Responsive Contraceptive Services: institutionalizing adolescent-responsive elements to expand access and choice. 2021; FP3030.
44. Research, harder+company community. Prevention with positives:best practices guide. Harder+company community research. 2009.
45. Cohen MS. Preventing sexual transmission of HIV. *Clin Infect Dis*. 2007; 45: S287-92.
46. De Cock KM, Crowley SP, Lo Y-R, Granich RM, Williams BG. Preventing HIV transmission with antiretrovirals. *Bull World Health Organ*. 2009; 87: 488-488A.
47. Rose CD, Koester KA, Kang Dufour M-SK, Myers JJ, Shade SB, McCreedy K, et al. Messages HIV clinicians use in prevention with positives interventions. *AIDS Care*. 2012; 24: 704-11.
48. Kavuma D, Ndiranza J, Kirwana VB, Mukasa Kafeero HM, Katongole SP, Baluku JB. Factors associated with condom use among out-of-school young people on anti-retroviral therapy in central Uganda. *HIV AIDS (Auckl)*. 2022; 14: 217-30.
49. CDC. Adolescent and school health. Atlanta: Centers for Disease Control and Prevention (US); 2022.
50. Meekers D, Agha S, Klein M. The impact on condom use of the "100% Jeune" social marketing program in Cameroon. *J Adolesc Health*. 2005; 36: 530.
51. Meekers D, Agha S, Klein M. The impact on condom use of the "100% Jeune" social marketing program in Cameroon. *J Adolesc Health*. June 2005; 36: 530.
52. Michielsen K, Chersich MF, Luchters S, De Koker P, Van Rossem R, Temmerman M. Effectiveness of HIV prevention for youth in sub-Saharan Africa: systematic review and meta-analysis of randomized and nonrandomized trials. *AIDS*. May 15, 2010; 24: 1193-202.
53. Garofalo R, Kuhns LM, Reisner SL, Biello K, Mimiaga MJ. Efficacy of an empowerment-based, group-delivered HIV prevention intervention for young transgender women: the Project LifeSkills randomized clinical trial. *JAMA Pediatr*. 2018; 172: 916-23.
54. Hosek S, Pettifor A. HIV prevention interventions for adolescents. *Curr HIV/AIDS Rep*. 2019; 16: 120-8.
55. Pettifor A, Bekker L-G, Hosek S, DiClemente R, Rosenberg M, Bull SS, et al. Preventing HIV among Young People: research priorities for the future. *J Acquir Immune Defic Syndr*. 2013; 63: S155-60.

56. DiClemente RJ, Ruiz MS, Sales JM. Barriers to adolescents' participation in HIV biomedical prevention research. *J Acquir Immune Defic Syndr*. 2010; 54: S12-7.
57. Vermund SH, Tique JA, Cassell HM, Johnson ME, Ciampa PJ, Audet CM. Translation of biomedical prevention strategies for HIV: Prospects and pitfalls. Nashville. *J Acquir Immune Defic Syndr*. 2013; 63.
58. PRB. UNFPA and. Status report adolescents and young people in sub-Saharan Africa opportunities and challenges. Johannesburg: United Nations Fund for Population Activities. 2012.
59. CAMPHIA. Cameroon population-based HIV impact assessment CAMPHIA 2017-2018. Yaoundé. CAMPHIA. 2020.
60. UNICEF. Adolescent HIV prevention. united nations children's fund. 2021.
61. Wong VJ, Murray KR, Phelps BR, Vermund SH, McCarraher DR. Adolescents, young people, and the 90–90–90 goals: a call to improve HIV testing and linkage to treatment. *AIDS*. 2017; 31: S191-4.
62. Bouba Y, Souleymanou A, Dzaddi Ard, Nkain FM, Lifanda E, Omona E, et al. Effectiveness of HIV self-testing in Cameroon: evidence from the star INITIATIVE. 2023.
63. Heck Craig J, Sanyukta M, Alwang H'a. Oluoch-Madiang Daniel, Rael Obanda, Mophine Owiti and Jerry Okal. Oral PrEP Consultations Among Adolescent Girls and Young Women in Kisumu County, Kenya: Insights from the DREAMS Program. Nairobi: *AIDS Behav*. 2022; 26.
64. UNAIDS. ORAL pre-exposure prophylaxis questions and answers. GENEVA: UNAIDS; 2016.
65. 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: 2587-99.
66. Peck ME, Ong KS, Lucas T, Harvey P, Lekone P, Letebele M, et al. Voluntary medical male circumcisions for HIV prevention — 13 countries in Eastern and Southern Africa, 2017-2021. *MMWR Morb Mortal Wkly Rep*. 2023; 72: 256-60.
67. World Health Organization. Joint United Nations Programme on HIV/AIDS. Joint strategic action framework to accelerate the scale-up of voluntary medical male circumcision for HIV prevention in Eastern and Southern Africa. Geneva, Switzerland: WHO/UNAIDS. Bansi: WHO/UNAIDS. 2012-2016.
68. 2011-Matharu,Edinah Mudimu. Martin-Hughes R, Hamilton M, Johnson L, Debra Ten Brink, et al. Cost-effectiveness of voluntary medical circumcision (VMMC) for HIV prevention across sub-Saharan Africa: results from five independent models. *Lancet Glob Health*. 2023; 11: e244-55.
69. McCoy SI, Watts CH, Padian NS. Preventing HIV infection: turning the tide for young women. *Lancet*. 2010; 376: 1281-2.
70. Gupta GR, Parkhurst JO, Ogden JA, Aggleton P, Mahal A. Structural approaches to HIV prevention. *Lancet*. 2008; 372: 764-75.
71. Pettifor A, MacPhail C, Hughes JP, Selin A, Wang J, Gómez-Olivé FX, et al. The effect of a conditional cash transfer on HIV incidence in young women in rural South Africa (HPTN 068): a phase 3, randomised controlled trial. *Lancet Glob Health*. 2016; 4: e978-88.
72. Baird SJ, Garfein RS, McIntosh CT, Özler B. Effect of a cash transfer programme for schooling on prevalence of HIV and herpes simplex type 2 in Malawi: a cluster randomised trial. *Lancet*. 2012; 379: 1320–9.
73. Pettifor A, MacPhail C, Selin A, Gómez-Olivé FX, Rosenberg M, Wagner RG, et al. HPTN 068: A randomized control trial of a conditional cash transfer to reduce HIV infection in young women in South Africa-study design and baseline results. *Aids Behav*. 2016; 20: 1863-82.
74. Lucie M, Boyes M, Orkin M, Pantelic T, Molwena L. Sherr. Child-focused state cash transfers and adolescent risk of HIV infection in South Africa: a propensity-score-matched case-control study. *Cluver*. *Lancet Glob Health*. 2013; 1: E362-70.
75. Handa S, Halpern CT, Pettifor A, Thirumurthy H. The Government of Kenya's cash transfer program reduces the risk of sexual debut among young people age 15-25. 1. *PLoS One*. 2014; 9: e85473.
76. CDC. Saving lives through the DREAMS program. CDC. 2022.
77. Naledi T, Little F, Pike C, Edwards H, Robbertze D, Wagner C, et al. Women of Worth: the impact of a cash plus intervention to enhance attendance and reduce sexual health risks for young women in Cape Town, South Africa. *J Int AIDS Soc*. 2022; 25: e25938.
78. UNICEF. When cash alone is not enough: the transformative power of cash plus programmes. s.l. united nations children's fund; 2018.
79. Roelen K, Devereux S, Abdulai A-G, Martorano B, Palermo T, Ragno LP. How to make "cash plus" work linking cash transfers to services and sectors,Office of Research – Innocenti working paper. Vol. 10. united nations children's fund; 2017.
80. de Walque D, Dow WH, Nathan R, Abdul R, Abilahi F, Gong E, et al. Incentivising safe sex: a randomised trial of conditional cash transfers for HIV and sexually transmitted infection prevention in rural Tanzania. *BMJ*. 2012; 2: e000747.
81. Ross D, Dick B, Ferguson J. Preventing HIV/AIDS in young people: a systematic review of the evidence from developing countries: UNAIDS interagency task team on HIV and young people. GENEVA: World Health Organization. 2006; 938: 1-13.