African Population and Health Research Center
Transforming lives in Africa through research.

Impact of DREAMS interventions in the prevention of HIV among adolescent girls and young women in Kenya

February 2024

Evidence Brief

Introduction

Over the years, HIV prevalence in Kenya has declined from a peak of about 10% in the 1990s to 4.5% in 2020 among adults aged 15-49. Similarly, HIV incidence is declining but remains higher among females than males aged 15-49, at 1.5 cases per 1000 women and 0.6 per 1000 men [1]. By 2015, over half (51%) of all new HIV infections occurred among adolescents and young people (aged 15-24 years), and 33% among young women specifically [2]. Additionally, the 2018 Kenya Population-Based HIV Impact Assessment (KENPHIA) report indicated that the HIV prevalence among women in urban areas was 6.7% compared to men at 2.7% and 6.5% among women compared to men at 3.4% in rural areas [3].

Furthermore, the HIV Estimates Report (2018) showed that in 2017, Nairobi, Homa Bay, Kisumu, Siaya, and Migori contributed 43% of the estimated total new HIV infections in Kenya, with more than 1000 new infections among young people aged 15-24 years in each of these counties. Particularly, young women aged 15-24 years accounted for a third of the new HIV adult infections [4]. Recent statistics from the Kenya National Syndemic Disease Control Council (2022) indicate minimal declines in HIV incidence (<50%) in Nairobi and Siaya. In 2022 the HIV incidence was 0.12% and 0.36% with an estimated 3,282 and 2,180 new infections in Nairobi and Siaya respectively [5]. In settings highly affected by HIV, the rate of infection rises rapidly among adolescent girls and young women (AGYW) aged 15-24 years than their male peers. In Siaya, for example, HIV incidence among females aged 15-24 years (0.45%) is over 3.5 times higher than the incidence among their male peers (0.12%); with an even larger gender gap among 15–19-year-olds [6]. This is the basis for prioritizing AGYW as a key population for HIV prevention measures in Kenya [7].

The Determined, Resilient, Empowered, AIDS-free, Mentored, Safe lives (DREAMS) interventions are a package of evidence-based biomedical, behavioral, and structural interventions that have been implemented in over 15 countries since 2016, to reduce the risk of new HIV infections among AGYW aged 10-24 years. These interventions target four main areas: reducing HIV risk among AGYW, reducing the risk among their sexual partners, mobilizing communities for change, strengthening families economically, and positive parenting. While the individual components of the DREAMS package have proven effective in some studies[8], their impact had not been evaluated when delivered as a multi-component package in real-world settings, particularly in trial conditions.

The context and problem

Although new HIV infections are happening in adolescent girls and young women, the vulnerability and risks are not uniform across this population [9]. In Kenya, past studies have shown that AGYW living in areas with high prevalence rates, for example, in urban informal settlements and the fishing communities in western Kenya, are at higher risk of acquiring HIV. AGYW may also have certain social vulnerabilities such as being out of school, orphanhood, experiencing early sexual debut, and being pregnant or having a child, which may expose them to greater risks [8],[9]. Therefore, targeting AGYW considered several layers of vulnerability to mitigate the risk.

Against this backdrop, the DREAMS program was implemented in various counties, including Nairobi and Siaya. These two counties have long-standing health and demographic surveillance systems (HDSS) where individual's health and social status are routinely updated. In Nairobi, DREAMS is being implemented in several slums, including Korogocho and Viwandani, where APHRC has been running an HDSS for the last 20 years covering approximately 100,000 individuals [10]. In Siaya County, DREAMS is being implemented in the rural areas of Gem subcounty, where the Kenya Medical Research Institute (KEMRI) has been running part of its HDSS for the last 21 years covering approximately a quarter million individuals [11]. In both settings, the African Population and Health Research Center (APHRC) and its partners conducted the first impact evaluation of DREAMS interventions over three years between 2017 and 2019, where the program had been implemented since 2016.

The evaluation showed improvements in some outcomes and risk factors [12]. For example, in both Nairobi and Gem, uptake of HIV testing and knowledge of HIV status was high among DREAMS participants compared to non-participants. Also, there was an increase in social support and self-efficacy measures among DREAMS participants, compared to those who did not participate. In Nairobi, DREAMS participants had better schooling outcomes such as enrollment and re-enrollment in school, school retention, and completing secondary school, but no change in sexual behavior. In Gem, it was too early in 2019 to measure changes in schooling outcomes but there was improvement in sexual behaviors like reductions in condomless sex and the number of lifetime sexual partners. There was no evidence of an impact on experiences of violence, or attitudes toward gender equity, among DREAMS participants in either setting. HIV incidence was measured at a community-wide level in the rural setting, with no evidence that DREAMS accelerated the decline in new infections by 2019.

At the time of the first evaluation (2017-2019), the implementation of the DREAMS program was in its formative stage, and it can be argued that the duration and complexity of implementation (of a multi-component program) was insufficient for interventions to embed within the communities and produce measurable results on HIV outcomes and psychosocial mediators of the program. Additionally, there was insufficient data to measure HIV incidence among AGYW in Nairobi. In 2022 we conducted another evaluation to establish the impact of DREAMS on HIV incidence, secondary outcomes, and mediators of empowerment.

Approach

Using the databases of the HDSS in Nairobi and Siaya, we randomly selected participants for a cohort study, and we have followed them up since 2017 in Nairobi and 2018 in Siaya. In Nairobi, we randomly selected a group of about 1,200 AGYW aged between 15 to 22 years (*intervention participants and non-participants*). Out of the total AGYW who we enrolled, we traced and interviewed 889 of them in 2022. In Gem, we selected 1258 AGYW and interviewed 1027 of them in 2022. We also recruited a cohort of 606 early adolescent girls aged 10-14 in 2017 in Nairobi and followed 534 in 2022. In Gem, we recruited 283 early adolescent cohorts aged 13-14 years in 2018 and followed up 266 in 2022. In both sites, we conducted qualitative interviews with AGYW, adolescent boys and young men (ABYM), community leaders, parents, DREAMS mentors, and the representatives of the DREAMS implementing partners (IP) to get a deeper understanding of the program delivery, benefits, challenges, and opportunities for improvement.

For analysis purposes, AGYW have been categorized into three exposure categories: 1) Non-DREAMS invitees (never invited into DREAMS) 2) Early DREAMS Invitees (invited to DREAMS from 2016-2018), and 3) Later DREAMS invitees (invited to DREAMS from 2020-2022 but had not been invited previously based on the vulnerability criteria). The second and third categories refer to the groups that received DREAMS interventions. In Gem, non-DREAMS invitees constituted 15.3%, early invitees 58.6%, and later invitees 26.2% of the cohort while in Nairobi the proportions were 13.6%, 71.5%, and 14.9% respectively. In order to quantify the impact of DREAMS on the various outcomes accessed, a causal inference framework was employed using regression analysis to account for possible confounders. The new results presented in this brief are based on the evaluation we conducted in 2022. Except for teenage pregnancies, all other results presented here are for the 15–22 age category.

Key findings

1. Uptake of DREAMS interventions

In Gem, the proportion of AGYW who ever tested for HIV was high among DREAMS and non-DREAMS participants with about 95% having tested. A higher proportion of DREAMS participants had received interventions in violence prevention, condom use, financial literacy, social asset building, and social protection than non-DREAMS AGYW. Modern contraceptive use was similar among DREAMS and non-DREAMS AGYW while pre-exposure prophylaxis (PrEP) use was lower among non-DREAMS AGYW, and gender norms-related education was similar in both groups.

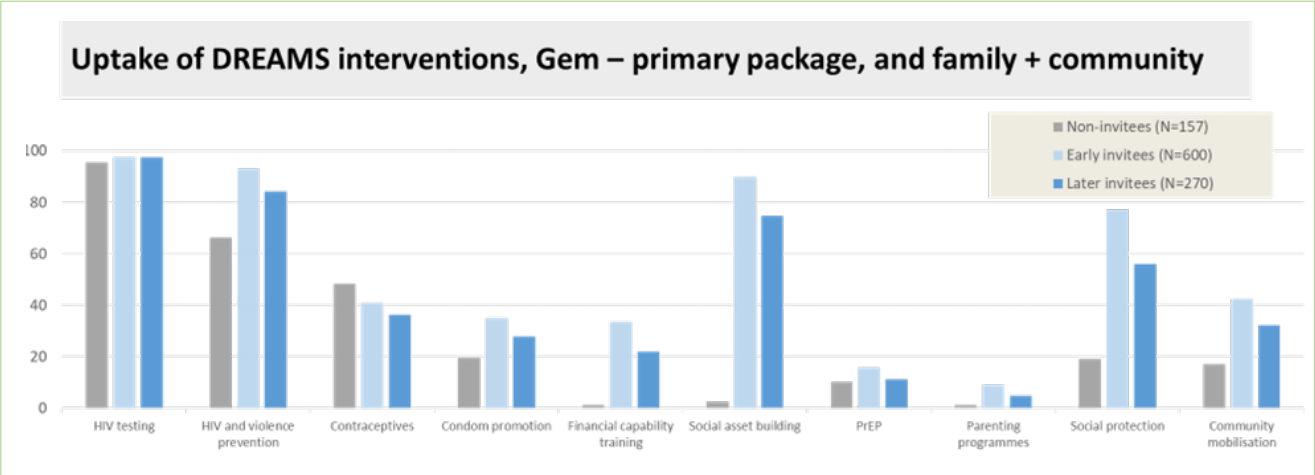

Figure 1: Ever participated in/ received DREAMS intervention in Gem, as reported in 2022 follow-up interviews

In Nairobi, the proportion of AGYW who ever tested for HIV was high (95%) for both DREAMS and non-DREAMS participants. Higher proportions of DREAMS AGYW had received interventions on violence prevention, condom promotion, financial capability training, social asset building, and social protection than non-DREAMS AGYW. Modern contraceptive use was similar in both groups while PrEP use was generally low but higher among DREAMS recipients.

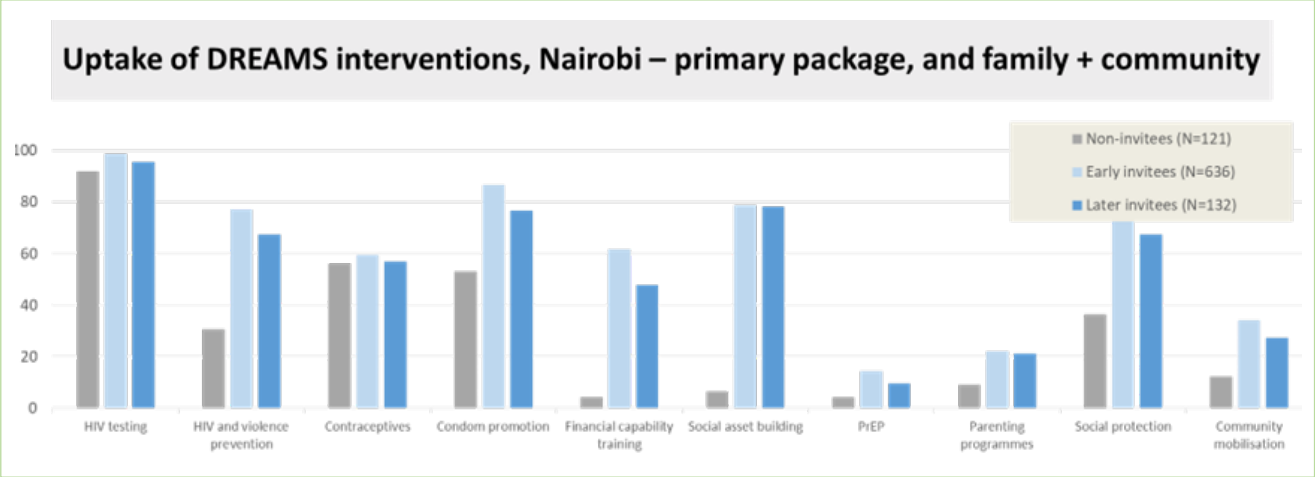

Figure 2: Ever participated in/ received DREAMS intervention in Nairobi, as reported in 2022 follow-up interviews

2. Impact of DREAMS interventions

We assessed the impact of DREAMS by comparing three hypothetical scenarios: all AGYW in the community were early DREAMS invitees, all AGYW in the community were late DREAMS invitees, or all AGYW in the community were non-invitees (i.e. no DREAMS interventions delivered in the community).

a. Knowledge of HIV Status

We estimated that the percentage of AGYW who knew their HIV status would be around 55% if all AGYW were non-invitees (no DREAMS interventions in the community), around 71% if all were early invitees and around 67% if all were later invitees in Nairobi. In Gem, we estimated that the percentage of AGYW who knew their HIV status would be around 73% if all were non-invitees (no DREAMS interventions in the community), and around 77% if all were early invitees, and around 77% if all were later invitees. The estimated percentage difference (the effect size attributed to DREAMS) among AGYW who knew their HIV status if all were early invitees compared with if all were non-invitees was around 16% in Nairobi and 4% in Gem. The estimated difference if all were later invitees compared with if all were non-invitees was 12% in Nairobi and 4% in Gem.

b. Uptake of effective HIV prevention methods

Based on the UNAIDS definition of a highly effective HIV prevention method *(Abstinence, Sex using a condom, knowledge that Partner is HIV negative, or Knowledge that partner is HIV positive and on ART)* with an HIV prevention target[13], that at least 95% of individuals are using a highly effective HIV prevention method (consistently, during last 3 months), we found that 95% in Gem compared to 93% in Nairobi were using one or more effective HIV prevention method. On causal analyses, we found only small differences between DREAMS and non-DREAMS participants on the uptake of effective prevention methods in both settings.

c. Impact on HIV Incidence

We observed a moderate to low HIV incidence in the two communities, with no difference between DREAMS and non-DREAMS invitees. In Gem, among 802 girls who were HIV-negative and aged 13-22 years in 2018, 14 (1.7%) had sero-converted four years later in 2022 (when aged 17-26 years). This corresponds to an HIV incidence rate of around 0.4% (4 per 1000 AGYW) per year during 2018-2022. This is lower than the annual estimate of HIV incidence among AGYW between 2016 and 2019, which was around 0.6% (6 per 1000 AGYW). In Nairobi, among 716 girls who were HIV-negative and aged 15-22 years in 2017, 13 (1.8%) sero-converted five years later in 2022 (when aged 20-27 years). This corresponds to an HIV incidence rate of approximately 0.4% (4 per 1000 AGYW) per year between 2017 and 2022.

d. Measures of Empowerment

We assessed DREAMS' impact on empowerment processes and outcomes using qualitative approaches. We sought evidence that DREAMS enables AGYW to exercise agency and take action, through expanded access to and control over resources and changes to the institutional structures that shape their lives and futures using the Bill and Melinda Gates Foundation conceptual model of women and girls' empowerment [14]. Additionally, we describe social support and self-efficacy among AGYW quantitatively.

i. Agency, Resources, and Institutional Structures

DREAMS participants demonstrated enhanced agency by participating in leadership roles within their context, better decision-making to improve their health and future prospects e.g., staying in school and or completing their education, saying no to early sex, and collective action through female solidarity and peer support systems created through DREAMS.

> *I always use what my mentor taught me to convince other girls not to fall to peer pressure. I tell them not to fall for traps set by men because after getting pregnant, they will be dumped, and they will end up dropping out of school while the boys continue with their education. (Adolescent girl, Gem)*

Some DREAMS participants received material resources such as education subsidies and hygiene products that enabled them to stay in school, entrepreneurship, and financial management training, and some received business start-up kits to enhance their financial independence. Many girls cited greater confidence and courage (forms of critical consciousness) gained through a mentor-led social asset-building curriculum and social capital. Mentors were a highly valued human resource, who provided counseling and capacity-strengthening among the AGYW. Accessing these resources reportedly reduced the need for transactional sex as the girls acquired greater economic autonomy and bodily integrity.

> *It was a journey because you would learn more from mentors and they also gave you confidence. Previously, I was a very shy girl and could not speak before people but after interacting with others [through DREAMS], I built my self-esteem. The mentors are just like big sisters, and you would just speak freely and learn a lot. (Adolescent girl, Nairobi)*

DREAMS engaged the broader community, leaders, parents, and ABYM in support of AGYW development and gender equality, and the uptake of HIV prevention services such as HIV testing and voluntary medical male circumcision. However, many participants felt that the girl-centered focus of DREAMS limited its impact on prevailing patriarchal structures or widespread poverty and violence, impeding a transformative impact on young women's empowerment.

> *A girl would be willing to go for training [and] maybe she is married. The husband will say that she cannot go. So also convincing the husband sometimes is a challenge. (Implementer, Nairobi)*

ii. Self-Efficacy

In both Nairobi and Gem, we observed patterns of higher self-efficacy among adolescent girls (aged 13/15-17years at study enrolment in 2017/18) who were invited to DREAMS vs those never invited to DREAMS. There was weak statistical evidence to support a causal association of the impact of DREAMS on self-efficacy among older participants, i.e., young women aged 18-22 at study enrolment. Self-efficacy was higher overall in Nairobi than in Gem.

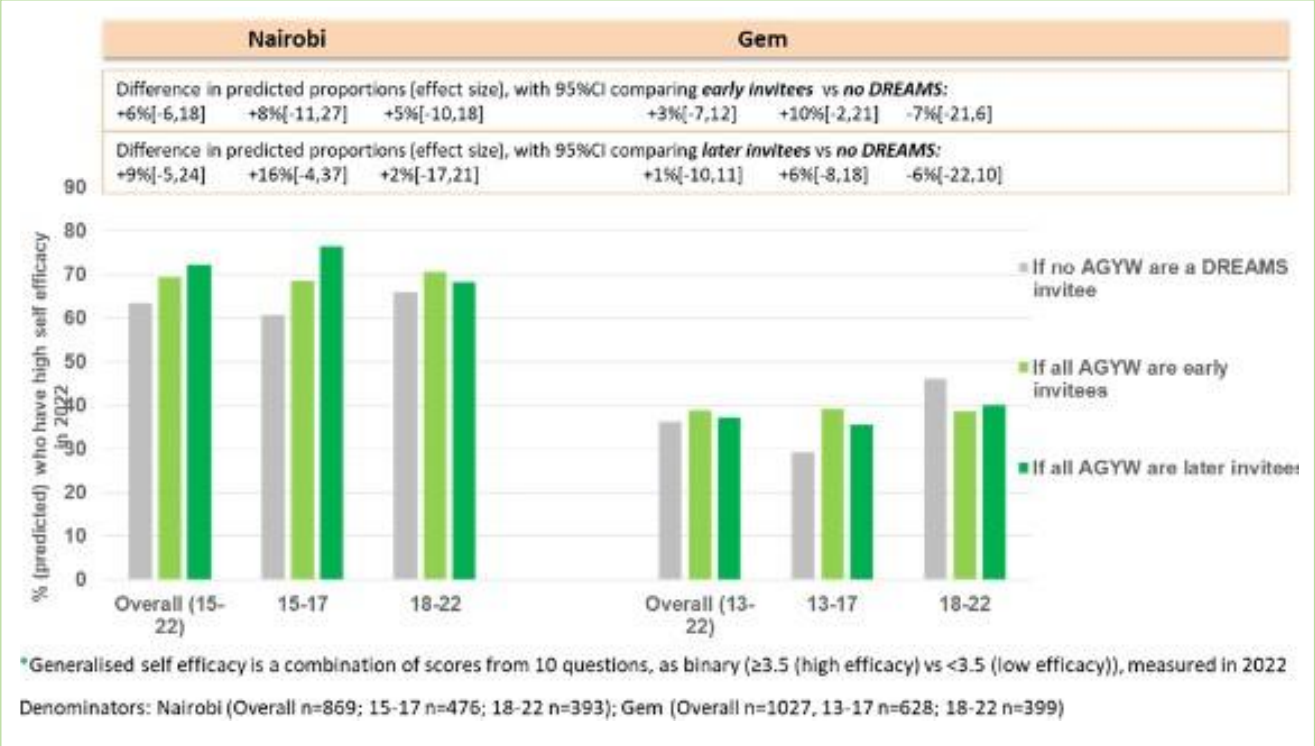

Figure 3: Impact of DREAMS on self-efficacy among AGYW in Gem and Nairobi

iii. Social Support

In both Nairobi and Gem, there was evidence that DREAMS had an impact on social support in 2022 among adolescent girls (aged 13/15-17years at study enrolment in 2017/18) but not among young women (aged 18-22years at study enrolment). Social support was approximately 10-14 percentage points higher among adolescent girls who were invited to DREAMS than those never invited to DREAMS. Statistical evidence for the impact of DREAMS on social support was stronger in Gem than in Nairobi.

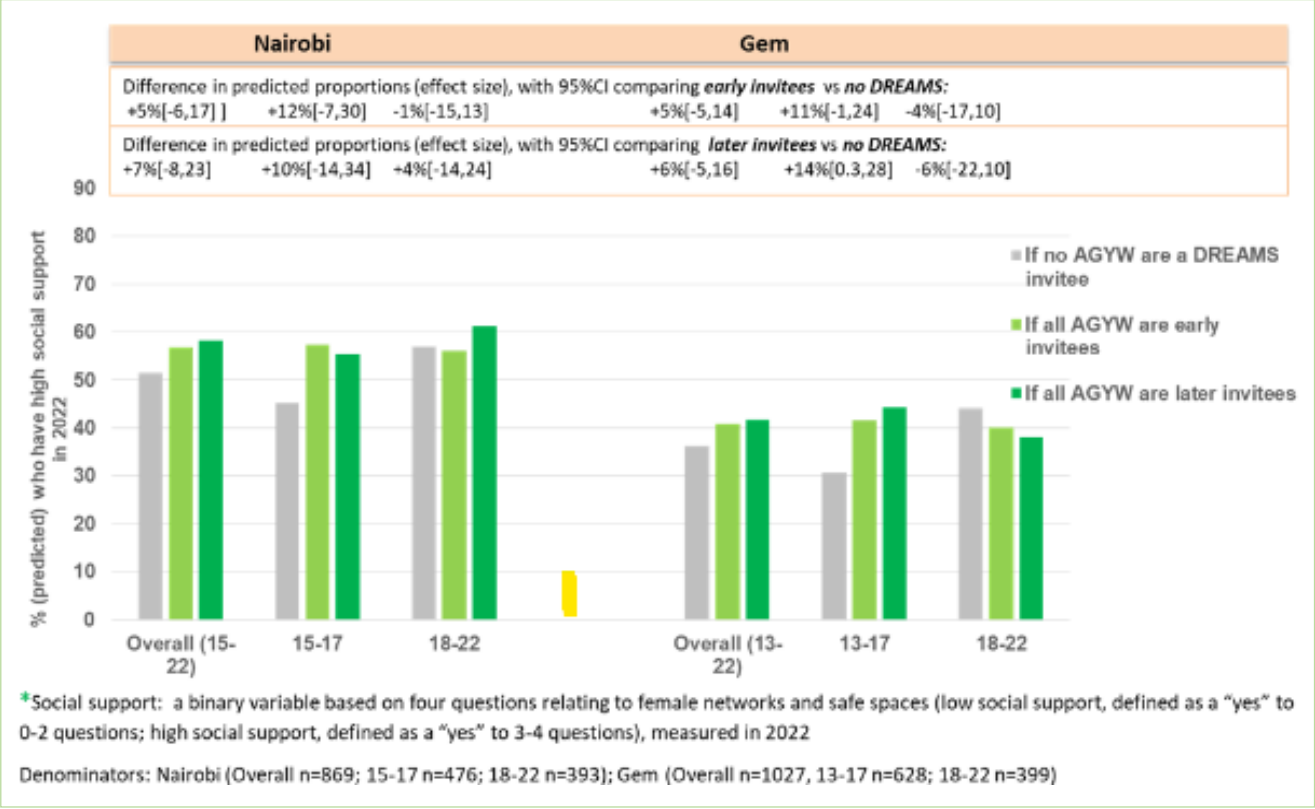

Figure 4: Impact of DREAMS on AGYW social support in Gem and Nairobi

e. Other outcomes

i. Sexual and gender-based violence

Among 1081 AGYW aged 15-22 years at enrollment in Nairobi in 2017, around 44% reported having ever experienced some form of violence (23% had experienced physical violence, 33% emotional violence, and 16% sexual violence) in the past year. By 2022, the proportion of AGYW experiencing any form of violence in the past year was 26.3% (14% physical, 17% emotional, and 10% sexual). In addition, 14% of non-invitees, compared to 16% of invitees reported experiencing all three forms of violence.

In Gem, among the 1171 AGYW aged 13-22 years at enrollment in 2018, 18% reported having experienced some form of violence (10.9% experienced physical violence, 9.2% verbal violence, and 5.3% sexual violence) in the past year. By 2022, the proportion of AGYW experiencing any form of violence in the past year was 16% (with 6% physical, 11% verbal violence, and 3% sexual). The AGYW who were invited to DREAMS reported higher proportions of all three forms of violence (16.5%) compared to non-invitees (10.9%).

ii. Sexual behavior

In Gem, in 2022 two-thirds of AGYW (approx. 781) reported they had ever had sex, around 60% reported that they had had sex in the previous 24 months, about 50% had had sex in the previous 12 months, and around 16% reported having more than three partners in the course of their lives. For the most recent partner in the last 24 months, 95% were a spouse or regular partner/boyfriend, 94% were the same age or one to 10 years older than the AGYW, and 6% were married to someone else. Four percent of AGYW reported they had another sexual partner in the last 12 months while in a relationship with the most recent partner.

In Nairobi, around 80% of AGYW reported they had ever had sex, around 75% reported that they had sex in the previous 24 months, two-thirds had had sex in the previous 12 months, and around 30% reported having more than three partners in the course of their lives. These outcomes were similar among invitees and non-invitees, for both Nairobi and Gem

iii. Teenage pregnancy

In both Nairobi and Gem, the early adolescents invited to DREAMS had slightly higher proportions of teenage pregnancy rates, though the differences are fairly small. Early adolescents who experienced teenage pregnancy may have been invited to DREAMS after their pregnancy, rather than before their pregnancy, and it is difficult (from the study data) to know which came first. This means that the impact of DREAMS on this outcome cannot be estimated reliably. Also, after 2020, teenage pregnancy was added as a criterion for invitation to DREAMS. However, for all categories (invitees vs non-invitees) in Nairobi, the pregnancy rate is lower than the national average of 15% in 2022. However, in Gem, the pregnancy rate for invitees is slightly higher than the national average of 15% in 2022.

Age at enrollment teenage pregnancy experience	Total teenage pregnancy	No Invitation n/n and percent	Early invitee	Later invitee	Combined DREAMS invitation
10-14 (Nairobi)	72/534 (13.4%)	3/28 (10.7%)	51/405 (12.6%)	18/101 (17.8%)	69/506 (13.6%)
13 -14 (Gem)	40/266 (15%)	4/29 (13.8%)	23/165 (13.9%)	13/72 (18.1%)	36/237 (15.2%)

iv. Impact on educational attainment

In Nairobi, at enrollment, 58% of AGYW were enrolled in school. Of these, 20% of AGYW had completed the primary level, 18% secondary level, and 4% tertiary level. By 2022, 60% of DREAMS invitees compared to 53% of non-DREAMS invitees had completed at least secondary level education whereas 24% of DREAMS invitees compared to 21% of non-invitees had completed tertiary education. In Gem, by 2022 73% of DREAMS invitees compared to 70% of non-DREAMS were in school or had completed secondary education. While the differences in education outcomes between DREAMS invitees and non-invitees were fairly small, it was a positive finding that the proportion of AGYW who completed some secondary school education was fairly high overall.

3. Reach, Barriers and facilitators to DREAMS implementation

Across both settings, DREAMS implementation began in 2016 and by 2022, 85% of AGYW interviewed had been invited into DREAMS. The invitation to participate in DREAMS was based on predefined vulnerability criteria. In general, DREAMS invitees were more likely than non-invitees to experience socio-economic vulnerability (e.g. food insecurity), or with high-risk sexual behaviors and being young mothers. However, even with the criteria in place, the implementation of DREAMS faced significant challenges including but not limited to:

a) Perceptions of unfairness: Discontent stemmed from the allocation of material benefits (e.g., educational/financial assistance and hygiene products), which were highly valued by AGYW in the study communities. Although criteria for receiving certain interventions were based on individual needs, there were strong perceptions of unfairness and disappointment among those who did not receive such benefits. This affected ongoing participation in DREAMS.

b) Further support for mentors: Mentors were instrumental to the implementation of the layered interventions- they linked AGYW, families, and implementers; delivered social asset-building curricula; facilitated referrals to other services; and followed-up mentees. Although passionate about their roles, mentors voiced the need for additional training, psychological support, and financial compensation more commensurate with their responsibilities and commitment.

c) Concerns on privacy: Delivery of interventions in community venues used as 'safe spaces' facilitated access and enhanced peer interaction. However, logistical challenges during implementation and large group sizes led to a perceived lack of privacy and sometimes discouraged some AGYW from participating in the safe spaces.

d) Socio-economic hardship: The context of socio-economic hardship influenced the demand for DREAMS, particularly material assets, and increased tensions with the community. Although community members acknowledged the benefits of DREAMS, strong feelings were consistently voiced about the greater involvement of boys and young men, e.g., in educational/financial assistance and HIV/violence prevention education.

e) Social Norms: The cultural context also imposed challenges to some intervention delivery, for example, beliefs that conflicted with sexuality education and condom promotion, particularly with young women.

Conclusions

- As of 2022, 85% of the original cohort had been invited to DREAMS.
- Coverage of HIV testing was high at over 95% ever tested among DREAMS and non-DREAMS participants.
- By 2022, there was improved layering of interventions whereby AGYW received all or most of the HIV prevention interventions that were included in the DREAMS primary package of interventions.
- In both sites, HIV incidence among AGYW was moderate, at around 0.4% per year, with no measurable difference between DREAMS participants and non-DREAMS participants. In Gem, HIV incidence continued to be on a downward trend but there was not enough evidence to attribute the observed trend to DREAMS as declines preceded the introduction of DREAMS.
- Looking at the triple threat of new HIV infections, Sexual and gender-based violence (SGBV), and teenage pregnancy, it appeared that while progress in aspects of HIV prevention was being made, little change was happening in SGBV, and teenage pregnancy rates remained high in these two study settings.
- DREAMS contributed substantially to the empowerment of AGYW by strengthening intrinsic and collective agency, facilitating them to access and utilize resources to reduce HIV risks. While most AGYW felt empowered, attaining their goals was not always guaranteed in reality due to the barriers they faced in the community.

References

[1] National AIDS Control Council. Kenya AIDS Strategic Framework II 2020/21 - 2024/25: Sustain Gains, Bridge Gaps and Accelerate Progress. Retrieved from https://nsdcc.go.ke/wp-content/uploads/2022/02/KASFII2revisedSeptember2021.pdf.

[2] National Syndemic Diseases Control Council. HIV Situation in Kenya. Retrieved from https://nsdcc.go.ke/hiv-situation-in-kenya/.

[3] National Aids and STI Control Program (NASCOP), Preliminary KENPHIA 2018 Report. Nairobi: NASCOP; 2020.

[4] National AIDS Control Council. Kenya HIV Estimates Report 2018. Retrieved from https://nsdcc.go.ke/wp-content/uploads/2018/11/HIV-estimates-report-Kenya-20182.pdf.

[5] National Syndemic Diseases Control Council. County HIV Posters 2022. Retrieved from https://nsdcc.go.ke/wp-content/uploads/2023/04/County-HIV-Posters_2022-Updated.pdf.

[6] UNAIDS and Naomi Estimates. HIV sub-national estimates viewer. Retrieved from https://naomi-spectrum.unaids.org.

[7] Saul, J. *et al.* The DREAMS core package of interventions: a comprehensive approach to preventing HIV among adolescent girls and young women. *PLoS One*, vol. 13, no. 12, p. e0208167, 2018. doi: 10.1371/journal.pone.0208167.

[8] Gallant, M. & and Maticka-Tyndale, E. School-based HIV prevention programmes for African youth. *Social Science & Medicine.*, vol. 58, no. 7, pp. 1337–1351, 2004. doi: 10.1016/S0277-9536(03)00331-9.

[9] Mathur, S. *et al.* HIV vulnerability among adolescent girls and young women: a multi-country latent class analysis approach. *International Journal of Public Health*, vol. 65, no. 4, pp. 399–411, April 2020. doi: 10.1007/s00038-020-01350-1.

[10] Beguy, D. *et al.* Health and Demographic Surveillance System Profile: The Nairobi Urban Health and Demographic Surveillance System (NUHDSS). *International Journal of Epidemiology*, vol. 44, no. 2, pp. 462–471, April 2015. doi: 10.1093/ije/dyu251.

[11] Odhiambo, O, F. *et al.* Profile: the KEMRI/CDC Health and Demographic Surveillance System—Western Kenya. *International Journal of Epidemiology*, vol. 41, no. 4, pp. 977–987, August 2012. doi: 10.1093/ije/dys108. PMID: 22933646.

[12] Gourlay, A. *et al.* Awareness and uptake of layered HIV prevention programming for young women: analysis of population-based surveys in three DREAMS settings in Kenya and South Africa. *BMC Public Health*, vol. 19, no. 1417, 2019. https://doi.org/10.1186/s12889-019-7766-1

[13] UNAIDS. 2025 AIDS TARGETS. Retrieved from https://aidstargets2025.unaids.org/#section-targets.

[14] Bill and Melinda Gates Foundation. A Conceptual Model of Women and Girls Empowerment. Retrieved from https://docs.gatesfoundation.org/Documents/BMGF_EmpowermentModel.pdf.

Acknowledgments

We acknowledge the study participants in Nairobi and Gem, the study team, evaluation partners, and the funder.

Authors' Information

Abdhalah Ziraba, Elizabeth Kemigisha, Jane Osindo, Stephen G Maina, Sarah Mulwa, Thomas Gachie, Moses Otieno, Faith Magut, Vivienne Kamire, Daniel Kwaro, Sammy Khagayi, Venetia Baker, Annabelle Gourlay, Isolde Birdthistle, Sian Floyd

African Population and Health Research Center

P.O.Box 10787-00100

APHRC Campus, Kitisuru, Nairobi, Kenya

Email: info@aphrc.org

Telephone: +254 (20) 400 1000, 266, 244 or 266 255

Mobile: +254 722 205 933, 733 410 102