HHS Public Access

Author manuscript

AIDS Behav. Author manuscript; available in PMC 2020 May 19.

Published in final edited form as:

AIDS Behav. 2020 February ; 24(2): 484–490. doi:10.1007/s10461-019-02560-2.

Chain Peer Referral Approach for HIV Testing Among Adolescents in Kisumu County, Kenya

Patricia Ong'wen[1], **Benard O. Samba**[1], **Michelle Moghadassi**[2], **Nicollate Okoko**[1], **Elizabeth A. Bukusi**[1], **Craig R. Cohen**[2], **Hilary T. Wolf**[3]

[1]Center for Microbiology Research, Kenya Medical Research Institute (KEMRI), Nairobi, Kenya

[2]Department of Obstetrics, Gynecology & Reproductive Sciences, University of California, San Francisco, San Francisco, CA, USA

[3]Department of Pediatrics, Georgetown University, 3800 Reservoir Road, NW, Washington, DC 20007, USA

Abstract

New HIV infections among adolescents continues to be a large public health burden in sub-Saharan Africa, with few adolescents accessing HIV testing and counseling (HTC) services. We evaluated the effect of a peer referral program among adolescents in Kisumu county, Kenya in accessing HTC. Female adolescents aged 15 to 19 years were recruited from three health clinics in Kisumu County. They, in turn, recruited their peers for HTC by handing out referral cards. Referrals would then recruit their peers and this peer-referral repeated for approximately 5 months. The 252 female index seeds showed a relatively higher-risk profile for HIV compared to the 792 referral participants. The referral system yielded an increased proportion of first-time adolescent testers from 13.1% among index seeds to 42.7% among the second wave of referrals. However, the peer referral system ultimately did not increase the absolute number of adolescents Queryaccessing HTC. Future strategies should consider these findings to better target those with undiagnosed HIV infection.

Keywords

HIV/AIDS; Adolescents; Testing; Counselling

Introduction

New HIV infections among adolescents continues to be a large public health burden in sub-Saharan Africa (SSA). In Kenya, it is estimated that 18,000 adolescents become infected with HIV annually, with girls disproportionately affected [1]. HIV testing and counseling (HTC) has been the gateway to HIV care and prevention including the reduction of HIV-

Hilary T. Wolf, hilarywolf@gmail.com.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

related sexual risk behaviors [2]. Although most adolescents know where they can be tested for HIV, the majority remain unaware of their HIV status. In Kenya, only 23.5% of adolescents aged 15–19 years know their HIV status, and only about half have ever tested for HIV [3], which is significantly below the target of 90%. Tragically, this is not only a missed opportunity for a well-known entry point to access care and treatment but also a means of preventing HIV infection through risk reduction counselling and provision of preexposure prophylaxis (PrEP) for those at substantial ongoing risk of acquiring HIV.

Adolescence is typically a period of peer influence, experimentation, new experiences and vulnerability. Millions of adolescents who are sexually active live in countries with a high incidence of HIV, thus the need for early and frequent HTC in this population [4]. The World Health Organization (WHO) has cited inadequate access to HTC as a contributing factor to the AIDS-related adolescent deaths [5]. Studies from both developed countries and countries in sub-Saharan Africa have found that many youth at high risk of HIV acquisition do not access testing due to a low perception of risk, perceived cost of services or lack of transportation to testing facilities, the absence of adolescent friendly services, legal and policy barriers that may require parental or guardian permission to test, and not having been offered a test [2, 6–8]. However, several studies have shown that encouragement from friends was an important motivation for seeking HTC among young people, while the main deterrent to HTC was fear of experiencing stigma and discrimination from friends and family [9].

A friendship-based peer chain referral approach, where index participants are identified and incentivized to recruit members of their network who may be hard to reach, has been effectively used to mobilize at risk crack users in El Salvador [10] and young African-American and Hispanic women for HIV testing in the US [11]. To our knowledge, the feasibility and effectiveness of this strategy in sub-Saharan Africa has not been documented. Thus, we sought to assess whether a friendship-based peer chain referral strategy could increase the number of adolescents aged 15 to 19 obtaining HTC, with a focus on testing high-risk female adolescents, and to understand the patterns associated with referrals of peers in Kisumu county, Kenya.

Methods

Study Design

We present a cross-sectional study involving three periurban and rural health clinics in Kisumu County, where demographic and clinical data was collected from adolescents aged 15 to 19 years. Participants were recruited as index participants (seeds), who then in turn recruited their peers for HTC.

Setting

Kisumu County is in the former Nyanza province of Kenya, with a HIV prevalence 3.4 times higher than the national prevalence at 19.9% [12]. This program was piloted in Rabuor sub-county hospital from September 2016 to March 2017, and later scaled up to Nyahera and Muhoroni sub-county hospitals between May 2016 and October 2017. These high-volume

County Health Facilities are supported by Family AIDS Care & education Services (FACES) [13], a U.S. President's Emergency Plan for AIDS Relief (PEPFAR)/Centers for Disease Control and Prevention (CDC)supported HIV care, treatment and prevention collaborative program between the Kenya Medical Research Institute (KEMRI) and the University of California San Francisco (UCSF).

Procedures

Tents were conveniently located near the health facility gates, where trained study staff (mobilizers) met the adolescents and conducted all the study procedures. The mobilizers explained the study objectives, procedures, and consented eligible adolescents to participate in the study. The eligibility criteria included being 15 to 19 years of age, willingness to answer the questions asked by the mobilizer, and willingness to discuss HIV counselling and testing with at least two age group peers within one month and give them referral coupons. The participants received HIV related information, and had their questions answered. Additionally, for the two later sites, an adolescent handbook [14] was given to the first 400 adolescent participants. Those who met the eligibility criteria and were willing to participate had their biometric and other demographic and clinical data recorded and were assigned a unique identifying number. Participants selected to receive 2 to 5 referral coupons depending on how many they would give to their peers to refer them to the same facility for HTC services. The referral coupons had unique serial numbers and identified the adolescents who came for HTC services as a result of a peer referral. The serial numbers were then recorded to link the waves to the referring individual. An initial incentive of Ksh.100 (approximately $1 USD) was given to all participants for transportation cost to the health facility, and later, an additional incentive of Ksh.100 was given to the referring individuals for each successful referral who came to the facility. This incentive was sent via mobile money to those who had access to phones, while those without phones were asked to visit the health facility after 2 weeks or later to receive the incentive.

Study Participants

Index Participants—Seeds—The index participants were recruited from antenatal clinics (ANC), maternal and child health clinics (MCH), postnatal clinics and the general outpatient clinics by the study coordinator in collaboration with the clinic staff. Sexually active adolescent girls aged 15 to 19 years, seeking these services and likely at higher risk of acquiring HIV, were targeted as seeds. Participants were required to give verbal consent to participate and be willing to discuss HIV counselling and testing with at least two of their age group peers within 1 month and refer them to the same health facility for HIV information and possibly HTC. Adolescents already known to be HIV positive were not excluded because they could potentially refer other high-risk adolescents, especially if they were horizontally infected. For this study, the term "seed" was only used for the index participants.

Referral Participants—Waves—The index participants (seeds) referred the first wave of eligible participants, who in turn referred the next wave of participants and this process continued until the end of the study period (approximately 5 months). Upon analysis of data from the pilot site, most of the participants that had been referred were male despite all seeds

being female. While scaling up to the additional two sites, we modified messaging and asked the seeds to issue more than half of their referral coupons to their female friends. The referred participants were eligible for enrolment if they were between 15 to 19 years of age, willing to undergo HIV counseling and/or testing, and willing to participate in the study, regardless of their HIV status. The recruitment continued for approximately 5 months, though during this period there was a nurses' strike, which lead to low utilization of health facilities.

Measures

Demographic characteristics (e.g. age, gender, marital status, employment, education) and referral characteristics (relationship to the index participant), testing outcomes and linkage to care (for those testing HIV positive) were collected from seeds and participants recruited during subsequent waves. In addition, we compared the characteristics of the seeds who successfully referred participants into subsequent waves compared to those who did not.

Analysis

Descriptive statistics were used to compare socio-demographic and clinical factors stratified in two ways: (1) by seeds versus subsequent referral waves, and (2) among seeds, stratified by those who successfully referred participants versus those who did not. We present medians, interquartile ranges (IQR), and row or column percentages as appropriate. To determine if the characteristics of index seeds differed from the referred participant waves, we used Kruskal–Wallis to test medians of continuous variables, Chi square to test categorical variables, and Fisher's exact tests as appropriate. All analyses used STATA version 14.0 (StataCorp LP College Station, TX, USA).

To explore the impact of peer referral on HTC uptake, we present monthly adolescent HIV testing numbers graphed 4 months pre- and post-implementation of peer referral as well as the percentage of facility HIV testing from peer referred clients. Adolescent HIV testing numbers per health facility were obtained from official monitoring and evaluation reporting to the Kenyan Ministry of Health.

Ethical Approval

Both the KEMRI Scientific and Ethics Review Unit (SERU) and UCSF Committee on Human Research approved the study. (SERU no NRP 1/2009, UCSF CHR ref 11-05348).

Results

During the study period, 1049 adolescents received HIV information, with 969 (92.4%) agreeing to be tested for HIV. About a third (33.4%) of them had never been tested for HIV before. The median age of all adolescents recruited was 17.2 years (IQR 16.1, 18.3) and the majority of them were female (61.7%) across all the sites, although Nyahera had the largest proportion of female participants (76.1%). Most of the participants were single (95.6%), in school (79.7%) and not employed (94.6%), with no major variations across the three sites.

Seeds

We recruited 252 female seeds to initiate the referral chain (Fig. 1; Table 1). The median age of seeds was 17.5 years (IQR 16.6, 18.4). 13.9% were married, 58.3% were in school and 85.7% of participants were not employed (Table 1). About half of the seeds (52.5%) were recruited while seeking general outpatient services while the rest sought HIV testing, HIV care, MCH and ANC services. Over three quarters of index adolescents (79.4%) underwent HIV testing, of whom, 4 (1.5%) tested newly positive for HIV (an additional 15 (6%) were already known to be positive). Despite issuing referral coupons to all the seeds, only 77 (30.6%) produced any successful referrals (data not shown). Rabuor clinic, as a pilot site, had the least proportion of seeds with successful referrals (19.5%) compared to Muhoroni and Nyahera sub-county hospitals that each had 40% successful referrals. Seed participants who went to the clinics seeking HTC had the largest proportion of successful referrals (47.3%) compared to those seeking all other services (15–40%, $p < 0.01$).

Waves

Although all seeds were female, the proportion of female participants was only 39.5% by the fourth referral wave. The proportion of married participants was highest among the index seeds (13.9%, Table 1) compared with < 1% among subsequent referral waves. Similarly, the proportion not in school was highest among the seeds (41.7%) compared with referred participants at 7.3% among the fourth wave of referred participants. Although 19 seeds (7.5%) were infected with HIV, participants identified during the referral waves had nearly zero HIV infections. However, the referral system yielded a high proportion of first-time adolescent testers among the referral waves (42.7%) compared with the seeds (13.1%, Table 1).

HIV Testing Over Time

Figure 2 represents total adolescent HIV testing at the three recruitment sites from 4 months prior to 4 months after initiation of the peer referral program. The percentage of adolescents tested that participated in the peer referral program are also indicated with the bar graphs. Although the absolute numbers of adolescents tested fluctuated over time seemingly without trend, the proportion of testers enrolled in peer referral peaked after 1 month of the program at Rabuor (48%) and by the third month at Nyahera (47%) and Muhoroni (61%) sub-country hospitals (Fig. 2).

Discussion

This study provided 1049 adolescents with HIV information and 969 with HIV testing services, a third of whom tested for HIV for the first time. Despite targeting sexually active adolescent girls as recruitment seeds, the peer chain referral system brought in an increasing number of male participants, and adolescents unmarried or in school and yielded only a small number of new HIV positive diagnoses. Furthermore, the peer chain referral did not appear to increase the numbers of adolescents tested per month in comparison to before the intervention in the three health facilities where the intervention was implemented.

During recruitment of seeds, sexually active adolescent girls, a group known to be high-risk for HIV acquisition [1], were targeted, hoping that they would refer other girls at risk. This hypothesis was based on findings of studies conducted in the developed world [11, 15], indicating that adolescents tend to have friends with similar risk profiles as themselves and tend to influence their peers to engage in similar behaviors i.e. getting tested for HIV. We had therefore expected that a large majority of the referrals would be female adolescents. However, our results did not support this hypothesis; adolescents in Kenya may have peers who engage in similar behaviors, but these were not the people who came for referral testing in Kisumu County. These findings suggest that the adolescent females were not very successful in referring their female peers to go to the health facilities for HTC. In this pragmatic setting, almost equal numbers of males and females tended to come in from peer-referral despite efforts to increase female referrals (i.e. starting with all female seeds, instructing participants to refer mostly females). The low proportion of seeds with successful referrals (30.7%) is based on observational outcomes in this low-resource setting and in the absence of generous incentives and research staff to assist the referral efforts. These two points highlight the limitations of peer-referral in this setting. Very few participants ultimately referred friends from their social networks and those that did come, were not as high risk as the seeds who initially referred their peers. The fact that the referrals yielded more school-going adolescents is consistent with results of a study carried out in Zambia [16], which indicated that comprehensive HIV knowledge was one of the facilitators of HIV testing among adolescents. In Kenya, where HIV education is part of the education curriculum, this knowledge could have contributed to the increasing numbers of in school adolescents observed coming for HTC as referrals. The declining HIV yield among participants coming as referrals suggests that either the adolescents who were reached were at low risk of contracting HIV, or those who were at risk of contracting HIV did not come for testing. Although reasons for not coming for HTC were not explored in this study, a systematic review of factors enabling and deterring uptake of HIV testing in sub-Saharan Africa suggested that stigma and social support could be contributing factors [17]. While adolescents may receive information, acknowledge the importance of knowing their HIV status, and even show willingness to seek testing, ultimate decisionmaking and attitudes towards testing may be influenced by concerns about anticipated stigma, possibly accounting for the different patterns of peer referral in the U.S. compared to Kenya.

The differential success in referrals by facilities could be attributed to the Rabuor clinic being a pilot site, where participants were not given the adolescent handbook [14] distributed at the later sites. The handbook contained adolescent focused material on sexuality, relationships and importance of testing. This could have motivated the adolescents to send their friends to the same facilities for HTC and could further explain why those coming for HIV testing services had more successful referrals than those coming for other services. In addition, messaging for referrals was improved at the subsequent sites.

Adolescents who participated in the study, regardless of whether they were seeds or waves, were willing to undergo HIV testing, to take the referral coupons and to talk to their age group peers about HIV testing, and refer them for HTC. However, the proportion of coupons leading to successful referral clients was as low as 20%. There are no published studies from sub-Saharan Africa where peer chain referral has been used to mobilize adolescents for

HTC, but this yield was much lower compared to a study of young African-American and Hispanic women in the US where adolescents and young women successfully recruited 2 to 5 of their close friends to participate in a community based HIV prevention intervention including HTC [11]. It is unclear whether the referral cards that were issued were not used by peers, or whether those adolescents who were given the cards did not give them out to their friends. However, the observed difference could have been due to the fact that adolescents prefer to have HTC delivered outside health facilities [9]. This has been further demonstrated by The Sustainable East Africa Research for Community Health community-based HIV testing strategy conducted in Kenya and Uganda which achieved 88% adolescent HIV testing coverage [18].

Our study had a number of limitations. First, the monthly testing numbers were greatly affected by extrinsic factors such as the prolonged health workers strike and the conflicting school schedule. The health workers strike led to low utilization of health facilities, and those given the referral coupons could have failed to go to the health facility because of uncertainty on whether they would receive services. Some school-going adolescents who received referral coupons could have also found it difficult to go to the clinic during school hours, which corresponded to the clinic hours. Secondly, we were unable to know who were given the referral cards, and therefore could not determine if high-risk adolescent peers were given cards and just did not come. Lastly, the study was limited to three clinics while the adolescents could have given the referral coupons to their peers living far away from these clinics, including those at boarding schools. For those living far away, the provided transport reimbursement may not have been sufficient to cater for transportation cost to and from the clinics. Adolescents in boarding schools often go to schools far away from their homes and would likely only have been able to access the designated health clinics during school holidays. Some of these limitations could have been further explained with a qualitative component to the study which could be explored in future studies. Some of these limitations could have contributed to the outcome that the peer referral intervention ultimately did not increase the absolute number of adolescents accessing HTC as well as the absolute number of newly diagnosed HIV infected adolescents. Additionally, adolescents seeking care at a health facility likely have a lower HIV risk compared to adolescents not seeking healthcare, Future studies should consider a peer chain referral approach in the community. Finally, this initiative targeted sexually active adolescent girls as they are known to be at high risk for HIV acquisition. Our findings may have limited external validity among other age or gender populations.

Despite these limitations, the adolescent peer chain referral system reached a large number of first-time testers. Previous studies suggest that individuals who seek HTC services either do it because they exhibit sexual risk behavior or consider themselves vulnerable to HIV infection [19]. Given their exposure to the HIV testing services, these first-time testers are likely to appreciate the importance of frequent testing and retest in the future, allowing earlier diagnosis and linkage to care, leading to better health outcomes [20]. Despite the low yield of new HIV infections, all participants received HIV information, risk screening and risk reduction counselling, which could be preventive against HIV acquisition [2, 20, 21].

Conclusions

In conclusion, the purpose of this study was to describe the pragmatic implementation of a peer-referral program to promote adolescent testing, particularly among high risk youth (i.e. girls). Although the peer chain referral approach did not show an increase in the absolute number of adolescents tested, we observed a large proportion of adolescent testers from peer referral, many of whom were first time testers. Interesting patterns emerged regarding referrals of peers for HTC that could be used to better understand HIV testing behaviors of adolescents in western Kenya and to design future HTC adolescent interventions. Future work should propose better targeted approaches guided by the results from this paper, namely, that peer-referral does not necessarily reach high-risk adolescents and those with undiagnosed HIV infection.

Acknowledgements

This project was supported by the Fogarty International Center of the National Institutes of Health (NIH) under Award Number R25TW009343 and the University of California Global Health Institute (UCGHI). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or UCGHI. Additionally, this work was supported by the Children's Investment Fund Foundation, Accelerating Children's HIV/ AIDS Treatment (ACT) Initiative, Grant Number A114918.

References

1. National STI and AIDS Control Programme. Kenya HIV Prevention Revolution Road Map. 2014 https://reliefweb.int/sites/reliefweb.int/files/resources/Kenya_HIV_Prevention_Revolution_Road_Map.pdf. Accessed 11 Oct 2017.
2. Black S, Wallace M, Middelkoop K, et al. Improving HIV testing amongst adolescents through an integrated Youth Centre rewards program: insights from South Africa. Child Youth Serv Rev. 2014;45(C):98–105.
3. National AIDS Control Council. Kenya's Fast-track Plan To End HIV and AIDS Among Adolescents and Young People. 2015 https://www.ilo.org/wcmsp5/groups/public/—ed_protect/—protrav/—ilo_aids/documents/legaldocument/wcms_532691.pdf. Accessed 11 Oct 2017.
4. Idele P, Gillespie A, Porth T, et al. Epidemiology of HIV and AIDS among adolescents. JAIDS. 2014;66:S144–53. [PubMed: 24918590]
5. World Health Organizaion. HIV and adolescents: guidance for HIV testing and counselling and care for adolescents living with HIV: recommendations for a public health approach and considerations for policy-makers and managers. 2013 http://www.who.int/iris/handle/10665/94334 Accessed 11 October 2017.
6. Lightfoot M, Dunbar M, Weiser SD. Reducing undiagnosed HIV infection among adolescents in sub-Saharan Africa: provider-initiated and opt-out testing are not enough. PLoS Med. 2017;14(7):e1002361. [PubMed: 28742800]
7. Eba PM, Lim H. Reviewing independent access to HIV testing, counselling and treatment for adolescents in HIV-specific laws in sub-Saharan Africa: implications for the HIV response. J Int AIDS Soc. 2017;20(1):21456. [PubMed: 28799324]
8. Reif LK, Rivera V, Louis B, Bertrand R, Peck M, Anglade B, et al. Community-based HIV and health testing for high-risk adolescents and youth. AIDS Patient Care STDS. 2016;30(8):371–8. [PubMed: 27509237]
9. World Health Organization. The Voices,Values and Preference of Adolescents on HIV Testing and Counselling: consultation for the Development of the World Health HIV testing and counselling guidelines for adolescents. 2013 http://www.who.int/iris/handle/10665/95143 Accessed 11 October 2017.

10. Glasman LR, Dickson-Gomez J, Lechuga J, Tarima S, Bodnar G, de Mendoza LR. Using peer-referral chains with incentives to promote HIV testing and identify undiagnosed HIV infections among crack users in San Salvador. AIDS Behav. 2016;20(6):1236–43. [PubMed: 26687093]
11. Harper GW, Dolcini MM, Benhorin S, Watson SE, Boyer CB. The benefits of a friendship-based HIV/STI prevention intervention for African American youth. Youth Soc. 2012;46(5):591–622.
12. National AIDS Control Council. Kenya HIV County Profiles. 2016 https://nacc.or.ke/wp-content/uploads/2016/12/Kenya-HIV-County-Profiles-2016.pdf. Accessed 11 October 2017.
13. Kulzer JL, Penner JA, Marima R, et al. Family model of HIV care and treatment: a retrospective study in Kenya. J Int AIDS Soc. 2012;15(1):8. [PubMed: 22353553]
14. National AIDS and STI Control Programme. Adolescent Handbook 2016.
15. Jeon KC, Goodson P. US adolescents' friendship networks and health risk behaviors: a systematic review of studies using social network analysis and Add Health data. PeerJ. 2015;3:e1052. [PubMed: 26157622]
16. Qiao S, Zhang Y, Li X, Menon JA. Facilitators and barriers for HIV-testing in Zambia: a systematic review of multi-level factors. PLoS ONE. 2018;13(2):e0192327. [PubMed: 29415004]
17. Musheke M, Ntalasha H, Gari S, Mckenzie O, Bond V, MartinHilber A, et al. A systematic review of qualitative findings on factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa. BMC Public Health. 2013;13(1):220. [PubMed: 23497196]
18. Kadede K, Ruel T, Kabami J, et al. Increased adolescent HIV testing with a hybrid mobile strategy in Uganda and Kenya. AIDS. 2016;30(14):2221–6.
19. Bradley H, Tsui A, Kidanu A, Gillespie D. Client characteristics and HIV risk associated with repeat HIV testing among women in Ethiopia. AIDS Behav. 2011;15(4):725–33. [PubMed: 20644989]
20. Kiene SM, Bateganya M, Wanyenze R, Lule H, Nantaba H, Stein MD. Initial outcomes of provider-initiated routine HIV testing and counseling during outpatient care at a rural ugandan hospital: risky sexual behavior, partner HIV testing, disclosure, and HIV care seeking. AIDS Patient Care STDS. 2010;24(2):117–26. [PubMed: 20059356]
21. Futterman DC, Peralta L, Rudy BJ, Wolfson S, Guttmacher S, Rogers AS. The ACCESS (adolescents connected to care, evaluation, and special services) project: social marketing to promote HIV testing to adolescents, methods and first year results from a six city campaign. J Adolesc Health. 2001;29(3):19–29. [PubMed: 11530300]

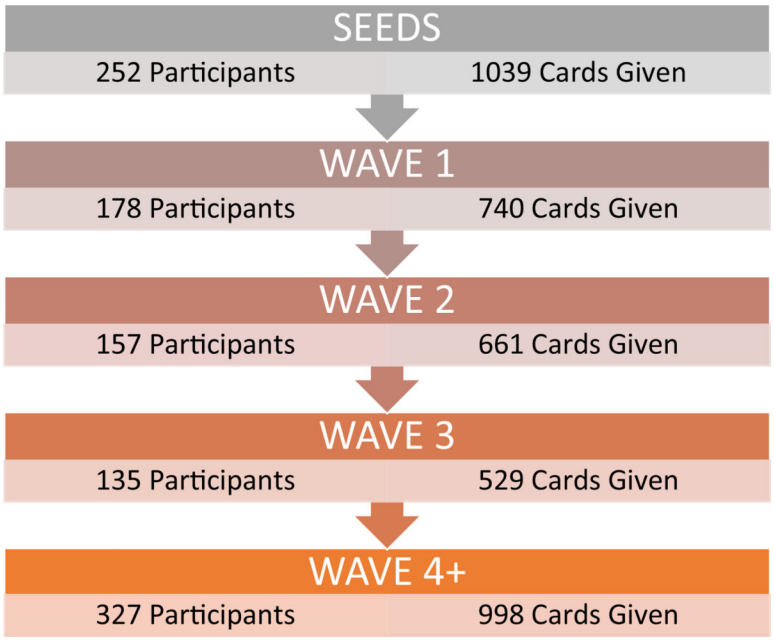

Fig. 1.
Flow diagram depicting number of participants enrolled as seeds and at each wave

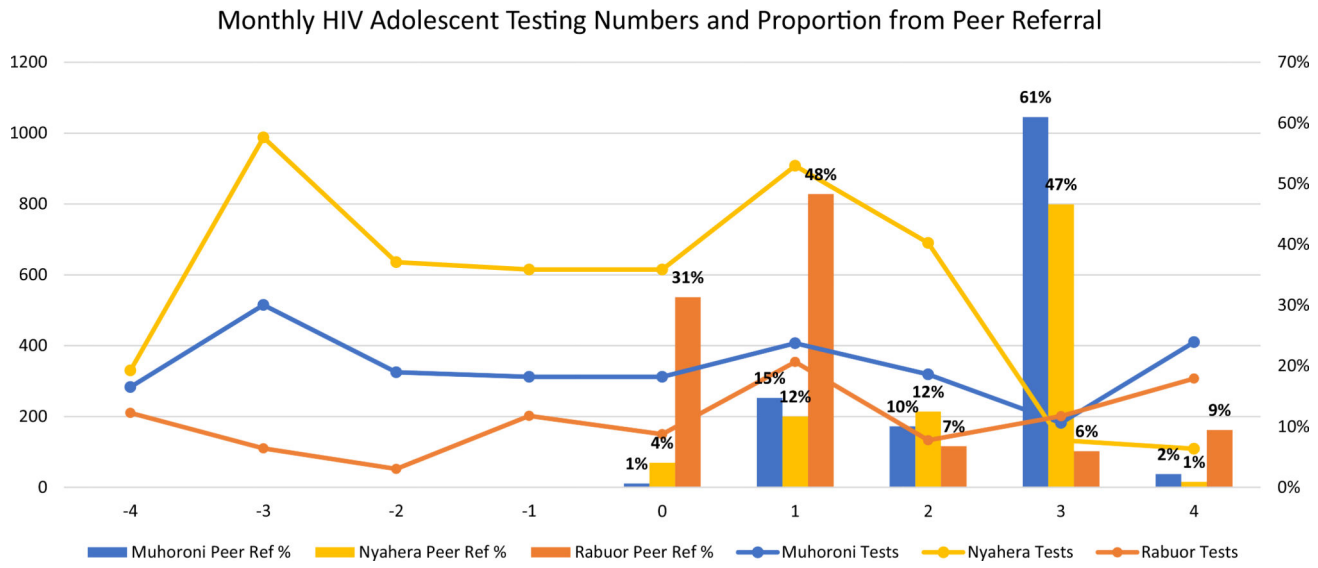

Fig. 2.

Monthly HIV testing among adolescents. Line graph represents monthly adolescent testing numbers from 4 months prior to 4 months post intervention. The bar graphs represent the proportion of those tested that were enrolled as referrals in the program

TABLE 1

Characteristics of adolescent seeds and referrals by wave

Measures	Wave 0 (seed) N = 252	Wave 1 N = 178	Wave 2 N = 157	Wave 3 N = 135	Wave 4 + N = 327	Total N = 1049	p value (Kruskal–Wallis, Chi square test)
	n (%) or median (IQR)	n (%) or median (IQR)	n (%) or median (IQR)	n (%) or median (IQR)	n (%) or median (IQR)	n (%) or median (IQR)	
Age (years)	17.7 (16.6,18.4)	17.5 (16.4,8.6)	17.1 (16.1,18.5)	17.5 (16.6,18.6)	16.8 (15.8,17.7)	17.3 (16.1,18.3)	< 0.01
Facility							< 0.01
Muhoroni	51 (20.2%)	70 (39.3%)	61 (38.9%)	43 (31.9%)	45 (13.7%)	270(25.7%)	
Nyahera	96 (38.1%)	78 (43.8%)	65 (41.4%)	61 (45.2%)	85 (26.0%)	385(36.7%)	
Rabuor	105 (41.7%)	30 (16.9%)	31 (19.8%)	31 (23.0%)	197 (60.2%)	394(37.6%)	
Gender							< 0.01
Female	252 (100%)	116 (65.2%)	84 (53.5%)	67 (49.6%)	129 (39.5%)	647 (61.7%)	
Male	0 (0%)	62 (34.8%)	73 (46.5%)	68 (50.4%)	198 (60.6%)	402 (38.3%)	
Marital status							< 0.01
Single	217 (86.1%)	172 (96.6%)	156 (99.4%)	134 (99.3%)	324 (99.3%)	1003 (95.6%)	
Married	35 (13.9%)	6 (3.4%)	1 (0.6%)	1 (0.7%)	3 (0.9%)	46 (4.4%)	
In school							< 0.01
No	105 (41.7%)	38 (21.4%)	22 (14.0%)	24 (17.8%)	24 (7.3%)	213 (20.3%)	
Yes	147 (58.3%)	140 (78.7%)	135 (86.0%)	111 (82.2%)	303 (92.7%)	836 (79.7%)	
Occupation							< 0.01
Employed	36 (14.3%)	9 (5.1%)	3 (1.9%)	4 (3.0%)	5 (1.5%)	57 (5.4%)	
Not employed	216 (85.7%)	169 (94.9%)	154 (98.1%)	131 (97.0%)	322 (98.5%)	992 (94.6%)	
Services sought on the visit day							< 0.01
HIV testing	49 (30.6%)	166 (96.5%)	151 (98.7%)	131 (97.8%)	324 (99.9%)	821 (87.1%)	
HIV care	4 (2.5%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (0.5%)	
MCH & ANC	23 (14.4%)	0 (0.0%)	0 (0.0%)	1 (0.8%)	0 (0.0%)	24 (2.6%)	
Other	84 (52.5%)	5 (2.9%)	2 (1.3%)	2 (1.5%)	0 (0.0%)	93 (9.9%)	
Missing	92 (36.5%)	6 (%)	4 (%)	1 (%)	3 (0.1%)	199 (19.0%)	
Tested on the visit day							< 0.01
No	52 (20.6%)	6 (3.4%)	2 (1.3%)	3 (2.2%)	17 (5.2%)	80 (7.6%)	
Yes, first time tester	33 (13.1%)	61 (34.3%)	67 (42.7%)	48 (35.6%)	134 (41.0%)	343 (32.7%)	
Yes, repeat tester	167 (66.3%)	111 (62.4%)	88 (56.1%)	84 (62.2%)	176 (53.8%)	626 (59.7%)	
HIV status							< 0.01
Negative	233 (92.8%)	172 (97.2%)	157 (100.0%)	134 (99.0%	327 (100%)	1023 (97.7%)	
New positive today	4 (1.5%)	3 (1.7%)	0 (0%)	1 (1.0%)	0 (0%)	6 (0.6%)	

Measures	**Wave 0 (seed) N = 252**	**Wave 1 N = 178**	**Wave 2 N = 157**	**Wave 3 N = 135**	**Wave 4 + N = 327**	**Total N = 1049**	**p value (Kruskal–Wallis, Chi square test)**
	n (%) or median (IQR)	**n (%) or median (IQR)**	**n (%) or median (IQR)**	**n (%) or median (IQR)**	**n (%) or median (IQR)**	**n (%) or median (IQR)**	
Known positive	15 (6.0%)	3 (1.7%)	0 (0%)	0 (0%)	0 (0%)	18 (1.7%)	
Proportion of referrals from the total coupons issued	Seeds, no referrals	178/1039 (17.1%)	157/740 (21.2%)	135/661 (20.4%)	327/(1527) (21.4%)	797/3967 (20.1%)	< 0.01