

# Assessing the Impact of a Small-Group Behavioral Intervention on Sexual Behaviors Among Adolescent Girls and Young Women in Lilongwe Malawi: A Quasi-Experimental Cohort Study

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## Abstract

Adolescent girls and young women (AGYW) in sub-Saharan Africa are at high risk of many adverse sexual and reproductive health outcomes. Small-group interventions addressing underlying vulnerabilities may influence risky sexual behaviors associated with these adverse outcomes. Girl Power-Malawi assessed whether a facilitator-led, curriculum-driven small-group behavioral intervention impacted risky sexual behaviors among AGYW in Lilongwe, Malawi. Four Health Centers were selected; two were randomly assigned to provide the intervention. Two-hundred fifty AGYW 15–24 years old were enrolled in each clinic (N = 1000 total), followed for 1 year, and interviewed at baseline and endline. At both time points participants reported on two behaviors in the last month (vaginal sex and  $\geq 2$  sexual partners) and two behaviors in the last year (age-disparate relationships and transactional relationships). In intervention clinics, there were no declines in risk behaviors between baseline and endline. Endline behaviors were not less risky in intervention clinics than control clinics. This intervention did not have a positive effect on four risk behaviors over a 1-year period.

**Keywords** HIV · Prevention · Risk · Adolescent · Sexual behavior

## Introduction

Adolescent girls and young women (AGYW) in sub-Saharan Africa face staggering risks of adverse sexual and reproductive health (SRH) outcomes. Ten percent of Malawian AGYW acquire HIV by the time they are 24 years old and

a majority experience a first pregnancy during adolescence [1]. Engagement in sexual activity and the number and nature of sexual partnerships are proximal determinants of these adverse SRH outcomes [1, 2]. Some of the highest risk partnerships are those with considerably older male partners and those with a transactional dimension [3, 4]. These proximal determinants are influenced by structural factors, including socio-economic vulnerabilities and unequal gender norms that leave women with limited power in their relationships [5–11].

Addressing these structural factors has the potential to alter these underlying vulnerabilities and the ensuing sexual behaviors [12]. Curriculum-based, theory driven, small-group interactive sessions that address these structural factors and teach AGYW knowledge and skills surrounding SRH have each influenced some sexual behaviors, relationship dynamics, or sexually transmitted infections (STIs) in randomized assessments [13–15]. The underlying logic is that discussing risky relationships and developing strategies and skills to leave unhealthy relationships and select healthier ones could have an impact on whether AGYW have sexual partners, how many partners they have, and whether

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these partners are older or transactional. However, to our knowledge, such sessions have never been delivered within the context of a clinic-based youth-friendly health services intervention, which would enable AGYW to address inter-related needs in a single location. In the Girl Power-Malawi study we assessed the impact of a small-group intervention for AGYW delivered within a youth-friendly clinic [16, 17].

The overarching question in this analysis is whether the behavioral intervention delivered within the Girl Power-Malawi study had an impact on a range of sexual behaviors among adolescent girls and young women in Lilongwe, Malawi: being sexually active, having multiple partnerships, having an older partner, or having a transactional relationship. We first assessed changes in behaviors over time within the intervention and control clinics and then compared end-line behaviors between intervention and control clinics.

## Methods

### Study Setting, Design and Population

Girl power was a prospective quasi-experimental cohort study comparing four combinations of interventions in South Africa and Malawi [16]. Due to important substantive and methodological differences in the intervention between the two countries, this analysis is restricted to Malawi. Girl Power-Malawi was conducted in public sector clinics in Lilongwe, the capital of Malawi. We compared the impacts of four different service delivery models on uptake of sexual and reproductive health services and sexual risk behaviors. Four government health centers were selected based on their proximity to a main road, antenatal volume (> 200 clients per month), and high antenatal HIV prevalence (> 5%). Selected clinics were randomly assigned to one of the four service delivery models.

- *Clinic 1*, the standard of care, offered vertical services (HIV testing, family planning, and STI treatment) to the general population, and permitted AGYW to attend, but there were no youth-friendly modifications.
- *Clinic 2* offered the same vertical services as clinic one, and also created an integrated youth clinic with many youth-friendly modifications. This youth clinic offered all three services (HIV testing, family planning, and STI treatment) in an integrated fashion and offered longer hours, youth-dedicated space, peer navigation, and non-judgmental providers.
- *Clinic 3* offered all of the same services as clinic two, and also offered a small-group behavioral intervention. The behavioral intervention consisted of 12 monthly interactive sessions led by a trained facilitator. Each session

lasted approximately 2 h and had an applied activity to complete afterwards. Sessions were designed for approximately 15 participants.

- *Clinic 4* offered all the services offered in clinic 3, as well as a monthly cash transfer (~\$5.50) that was conditional on monthly behavioral intervention session attendance.

For this analysis, the primary comparison was between participants who were not exposed to the behavioral intervention (clinics 1 and 2, “control clinics”) and those who were exposed to the behavioral intervention (clinics 3 and 4, “intervention clinics”).

Participant recruitment occurred through community outreach by study-hired peer navigators, peer chain referral from enrolled participants, and self-referral. No recruitment occurred directly from other parts of the clinic itself. All recruitment procedures were conducted consistently across clinics and have been described in greater detail previously [16]. At each site, recruitment occurred through a combination of community outreach activities, self-referral, and referral through invitations from their enrolled peers. Some participants understood what services would be available prior to presenting to the clinic and enrolling. Persons were eligible if they were female, 15–24 years old, willing to provide locator information, and lived in the clinic’s catchment area. Participants who were previously sexually active or likely to become sexually active (based on conversations with study recruiters) were purposefully selected. Two-hundred and fifty AGYW were enrolled in each of the four clinics. The study design has been described in greater detail previously [16], as well as an assessment of the impact of youth-friendly health services on uptake of clinical services [17]. Briefly, those in clinics 2, 3, and 4 all had considerably higher uptake of HIV testing, non-barrier contraception, condoms, and STI services compared to those in clinic 1.

### Data Collection and Management

For this analysis two study assessment tools were used: a behavioral survey and a behavioral intervention attendance log. In the behavioral survey, participants were surveyed at enrollment (baseline) and 12 months from enrollment (end-line). Trained young female research staff conducted in-person structured interviews in Chichewa, the primary local language. Data were captured using Open Data Kit (ODK) software on Android tablets. Survey topics included demographic and socio-economic characteristics, sexual behavior history, and a detailed partner grid. Intervention facilitators recorded behavioral intervention session attendance on paper intake forms. They filled out one form each time they conducted a session. Forms included participant unique identification numbers, a facilitator unique identification

number, the session date, and the session numbers. These forms were uploaded by the facilitator into ODK and stored on a secure server.

All behavioral surveys and session attendance forms were managed, cleaned, and analyzed using Stata 15 (College Station, Texas).

## Intervention Content and Implementation Considerations

Intervention sessions were administered by trained facilitators who were also young women 20–30 years old. One facilitator was assigned to each clinic. Facilitators had completed secondary school and had post-secondary diplomas in community development, previous experience working with AGYW, and strong interpersonal skills. They were supervised by a Senior Research Officer (TP) who trained facilitators on each session, modeled the session by conducting it the first time, and provided routine feedback on fidelity. Each of sessions was offered multiple times at each clinic to accommodate all 250 participants.

Each session had a common structure. Each started with a brief “icebreaker,” an activity designed to engage the group and promote participation. Then facilitators briefly reviewed the at-home activity assigned from the previous session and reinforced concepts from that session. Next, the facilitator led interactive activities, which often included individual introspection, role-plays with one another, or case studies. Each session concluded with a description of the at-home activity and a summary of the session’s key messages.

Intervention sessions addressed a range of topics, including health information (e.g. HIV and sexual and reproductive health); intimate relationships (e.g. partner communication, intimate partner violence); life skills (e.g. goal-setting, problem-solving); economic empowerment (e.g. income generation, budgeting, and saving) and personal reflection (e.g. sexuality, self esteem) (Supplement).

## Exposures, Outcomes, and Covariates of Interest

The primary exposure of interest in this analysis was study participation in one of the behavioral intervention clinics ( $N = 500$ ) or control clinics ( $N = 500$ ), the intention to treat analysis. Secondly we compared those who attended at least 10 sessions, nearly the full intervention ( $N = 234$ ), to those who attended  $\leq 3$  sessions ( $N = 529$ ), little or none of the intervention, regardless of clinic assignment, a per protocol analysis.

The outcomes of interest for this analysis were sexual risk behaviors self-reported by participants on the baseline and endline behavioral surveys. Outcomes of interest included:

- *Vaginal sex in the last month* Those who reported they had at least one sexual partner in the last month.
- *Multiple partnerships in the last month* Those who reported two or more partners in the last month.
- *Age disparate sex in the last year* Of the three most recent partners in the last year, whether or not any were  $\geq 10$  years older. This variable has been associated with increased HIV incidence in the Malawi DHS [1] and HIV prevalence in our cohort [2].
- *Transactional sex in the last year* Of the three most recent partners in the last year, whether or not the participant felt compelled to have sex with at least one of them because she received money or other items from him.

All outcomes were dichotomized into yes or no responses for purposes of analysis.

## Data Analysis

First, we reported the number and proportion of participants who had each socio-demographic characteristic, as well as the number and proportion who experienced each sexual behavior at baseline. Chi square tests were conducted to compare these socio-demographic and behavioral characteristics between the intervention and control clinics.

Next, we calculated the change over time between baseline and endline for each sexual behavior in intervention and control clinics (Table 2). We fit generalized estimating equations to account for correlated observations within the same subject using exchangeable correlation matrices. These models had an identity link and a binomial distribution to calculate unadjusted and adjusted risk differences (aRD) and 95% confidence intervals (CI). To account for differences in population socio-demographics we adjusted for age and asset index.

To examine differences between intervention and control clinics at endline we fit generalized estimating equations with exchangeable correlation matrices to account for correlated observations within each clinic (Fig. 1). These models used an identity link and a binomial distribution (Fig. 1). In these models, we also estimated risk differences and 95% confidence intervals. The primary intention-to-treat analyses compared all retained participants in intervention clinics to all retained participants in control clinics. Secondly, we conducted per protocol analyses and compared those who attended  $\leq 3$  sessions, regardless of arm, to those who attended  $\geq 10$  sessions. Participants who attended 4–9 sessions were excluded from per protocol analyses. For both intention-to-treat and per protocol analyses, we fit both unadjusted and adjusted models to the data. Adjusted models included the baseline value of the outcome of interest, age, and asset index.

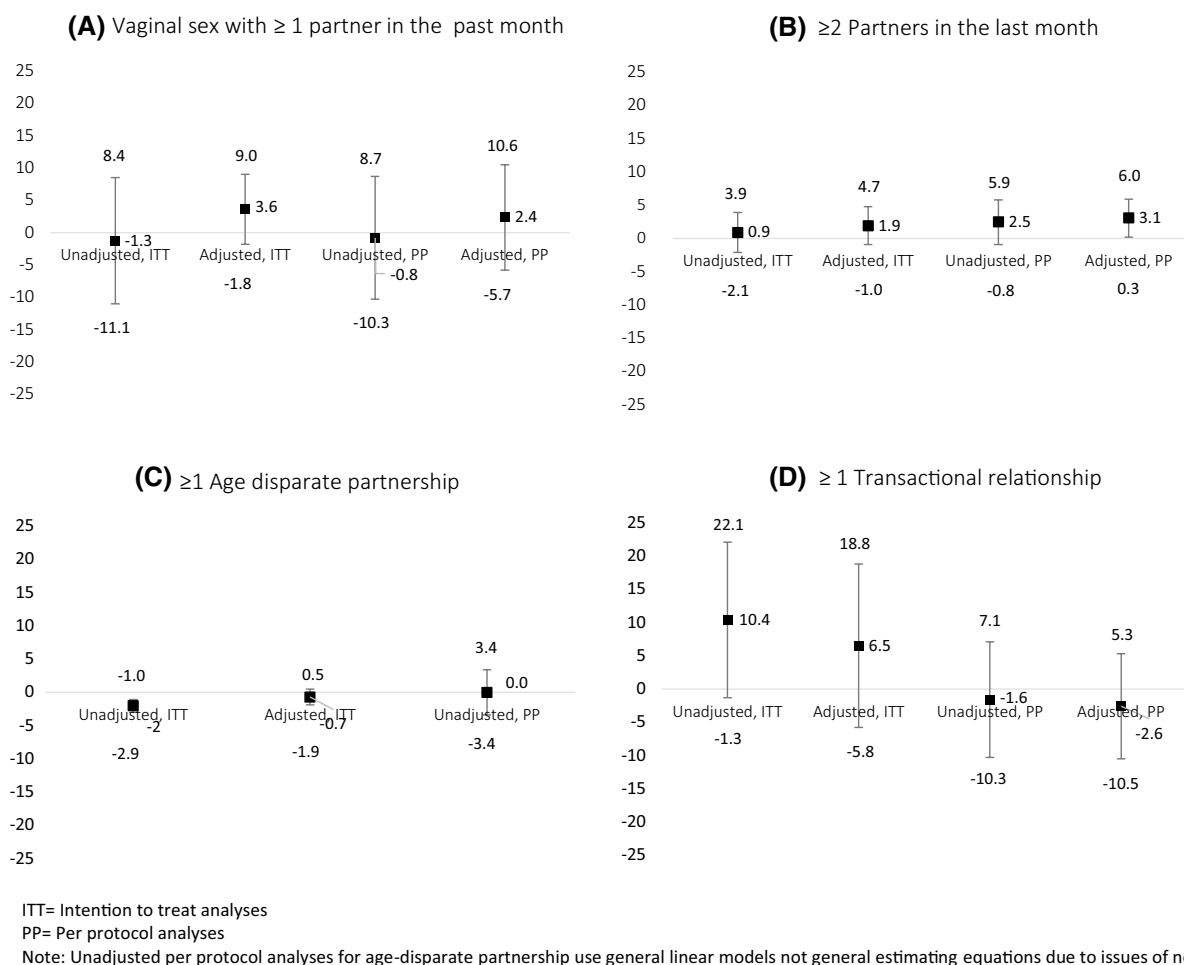


Fig. 1 Risk differences between intervention and control clinics at endline

## Ethics

Participants 18–24 years old provided written informed consent. Participants 15–17 years old provided written assent and obtained written informed consent from a parent, guardian, or other authorized adult. The University of North Carolina Institutional Review Board and Malawi’s National Health Sciences Research Committee granted approval to conduct this study and provided regulatory oversight.

## Results

### Population Characteristics

One thousand AGYW were enrolled in the study and had a baseline visit. The median age at baseline was 19 years (interquartile range 17–21 years). The majority of participants were never married (71%) and had completed

primary school (70%). Nearly all participants (99%) reported being sexually active in their lifetimes. Participants in intervention clinics differed from those in control clinics with respect to several sociodemographic attributes (Table 1). Those in the intervention and control clinics were comparable with respect to vaginal sex and number of sexual partners in the last month. However, those in the intervention clinics were less likely to report age-disparate sex or transactional sex in the last year, reinforcing the importance of adjusting for baseline factors in endline models.

Retention in the twelve-month endline behavioral survey was 87% and this did not differ between intervention and control clinics ( $X^2 = 0.078$ ,  $p = 0.8$ ). Within the two intervention clinics, a higher proportion of those who completed  $\geq 10$  sessions also completed an endline survey compared to those who completed  $\leq 3$  sessions, (98% vs. 73%,  $X^2 = 55.65$ ,  $p < 0.001$ ). Retention in the endline survey was not associated with baseline vaginal sex,

**Table 1** Baseline characteristics

	Clinics 1 and 2 (control)		Clinics 3 and 4 (intervention)		X <sup>2</sup> test statistic	p value
	N	%	N	%		
Sociodemographic characteristics						
Age (years)						
15–17	152	30	130	26		
18–20	183	37	220	44		
21–24	165	33	150	30	5.83	0.054
Marital status						
Single	296	59	418	84		
Married	166	33	49	10		
Divorced/widowed	38	8	32	6	85.03	< 0.001
Education level						
Did not complete primary	178	36	109	22		
Completed primary	319	64	384	77	22.58	< 0.001
Orphan status						
Both parents alive	349	70	306	61		
Single orphan	113	23	147	29		
Double orphan	38	8	47	9	8.22	0.016
Asset Index						
≤ 2 assets	247	49	148	30		
≥ 3 assets	253	51	352	70	41.01	< 0.001
Sexual behavior						
Vaginal sex with > 1 partner in past month						
No	124	25	147	29		
Yes	375	75	353	71	2.62	0.106
≥ 2 partners in the last month						
No	470	94	463	93		
Yes	29	6	37	7	1.02	0.312
> 1 age disparate partnership						
No	461	93	478	96		
Yes	37	7	21	4	4.72	0.03
> 1 transactional relationship						
No	383	76	426	87		
Yes	117	24	74	13	11.97	0.001

age-disparate sex, or transactional sex. However, participants in the full sample who reported ≥ 2 partners in the last month at baseline were less likely to participate at endline ( $X^2 = 5.43$ ,  $p = 0.02$ ).

### Intervention Implementation

In both clinics, session attendance was highest at session 1 (86%) with a trend towards lower attendance by session 12 (52%). On average, participants in clinic 4 attended more sessions than those in clinic 3 (8.7 versus 6.2, ( $t = -6.88$ ,  $p < 0.001$ )). The proportion of participants in clinic 4

who attended ≥ 10 sessions was higher (56% versus 40%,  $X^2 = 11.57$ ,  $p < 0.001$ ) and the proportion who attended ≤ 3 sessions was lower (10% vs. 44%,  $X^2 = 74.01$ ,  $p < 0.001$ ).

Session attendance was not associated with number of sexual partners, age-disparate sex or transactional sex at baseline. However, at baseline, those who were sexually active in the past month attended fewer sessions ( $X^2 = 6.63$ ,  $p = 0.01$ ).

Participants preferences with respect to the intervention varied. The most preferred sessions were Session 9 on Budgeting, Saving, and Investing (29%); Session 3 on Pregnancy and Contraception (16%); and Session 4 on HIV Risk and Prevention (10%). Eighty-two percent of

participants considered their favorite aspect of the intervention to be the content they learned. Other favorite aspects included the facilitators (7%) and peer interaction (7%).

### Vaginal Sex in the Last Month

At baseline, 73% of participants reported vaginal sex in the past month and this remained similar at endline (72%). Changes in the proportion reporting vaginal sex were not observed over time in either the intervention (aRD 0.5%, 95% CI -2.1%, 3.2%) or control clinics (aRD -2.5%, 95% CI -5.1%, 0.0%) (Table 2).

At endline in both unadjusted and adjusted intention-to-treat analyses participants assigned to intervention clinics were as likely to report vaginal sex in the last month as participants from control clinics (RD -1.3%, 95% CI -11.1, 8.4; aRD 3.6%, 95% CI -1.8, 9.0) (Fig. 1a). Similarly, in both unadjusted and adjusted per protocol analyses, there were no differences in endline outcomes between participants who attended  $\geq 10$  sessions compared to those who attended  $\leq 3$  sessions.

### Multiple Partnerships in the Last Month

At baseline, 7% reported  $\geq 2$  partnerships in the last month and this remained comparable (5%) at endline (Table II). Declines in this variable were not observed in the intervention (aRD -1.0%, 95% CI -2.4%, 0.6%) or control clinics (aRD -0.8%, 95% CI -2.1%, 0.5%).

At endline, in unadjusted and adjusted intention-to-treat analyses, the proportions reporting  $\geq 2$  partners were comparable in intervention and control clinics (RD 0.9%, 95% CI -2.1%, 3.9%; aRD 1.9%, 95% CI -1.0, 4.7). In adjusted per protocol analyses, participants who attended  $\geq 10$  sessions were 3% more likely to report having  $\geq 2$  partnerships in the last month compared to those who attended  $\leq 3$  sessions (Fig. 1b).

### Age-Disparate Partnerships in the Last Year

At baseline, 6% of participants reported age-disparate sex in the last month and this remained comparable (5%) at endline (Table 2). Declines were not observed in either the intervention (aRD 0.0%, CI -1.1, 1.2) or control clinics (aRD -0.3%, CI -1.7, 1.1).

At endline, in unadjusted intention-to-treat analyses the proportions reporting age-disparate relationships were lower in the intervention compared to the control clinics (RD -2.0%, CI -2.9%, -1.0%). However, this effect attenuated in adjusted analyses (aRD -0.7%, CI -1.9%,

0.5%) (Fig. 1c). In unadjusted per protocol analysis results were identical between the intervention and control clinics (RD: 0.0, CI -3.4%, 3.4%). Adjusted per protocol analysis would not converge.

### Transactional Partnerships in the Last Year

At baseline 19% of participants reported at least one transactional partnership in the last year and this remained comparable (18%) at endline (Table 2). Transactional sex declined modestly in the control clinics (aRD -5.7%, 95% CI -8.0, -3.5) and increased modestly in the intervention clinics (aRD 4.4%, 95% CI 2.1, 6.6).

In unadjusted and adjusted intention-to-treat analyses, the proportion of participants reporting transactional relationships were similar in intervention and control clinics at endline (RD 10.4%, 95% CI 1.3, 22.1; aRD 6.5%, -5.8, 18.8) (Fig. 1d). In per protocol analyses, endline outcomes were comparable among those who attended  $\geq 10$  sessions compared to those who attended  $\leq 3$  sessions (RD -1.6%, 95% CI -10.3, 7.1; aRD -2.6%, 95% CI -10.5, 5.3).

## Discussion

In a cohort of AGYW at risk for HIV and other adverse sexual and reproductive health outcomes, we observed that a small-group behavioral intervention failed to have a positive impact on four key behaviors associated with HIV in this population: recent sexual activity, multiple partnerships, age-disparate sex, and transactional sex [2]. Among intervention participants, we did not observe any improvements in these four outcomes over time. At endline, we did not observe better outcomes among participants in intervention clinics compared to participants in comparison clinics. These results did not differ when examining dose of the intervention or adjusting for baseline behaviors. These null findings are likely explained by a combination of intervention content, fidelity, and methodologic considerations.

The intervention content, along with its mode of delivery, may not have been the best way of addressing structural vulnerability and ultimately eliciting meaningful behavior change. We hypothesized that addressing a range of underlying socio-economic vulnerabilities and gender inequalities through an AGYW-only safe-space could serve as a platform for addressing these structural vulnerabilities. However, by not engaging friends, sexual partners, family members, or communities we may have isolated participants from their organic social networks, making it challenging to enact ideas learned in the sessions. Although sessions centered around addressing structural vulnerabilities, participants may not have had the agency or ability to make these changes.



**Table 2** Changes in sexual behavior between baseline and endline

	Control clinics						Intervention clinics					
	Unadjusted			Adjusted <sup>a</sup>			Unadjusted			Adjusted <sup>a</sup>		
	%	RD	CI	%	RD	CI	%	RD	CI	%	RD	CI
Vaginal sex with ≥ 1 partner in past month												
Baseline (N=499)	75.2	0.		0			70.6	0.		70.6	0.	
Endline (N=432)	72.5	-1.4	(-4.0, 1.3)	-2.5		(-5.1, 0.0)	71.0	0.3		71.0	0.3	
≥2 partners in the last month												
Baseline (N=499)	5.8	0.		0			7.4	0.		7.4	0.	
Endline (N=432)	4.2	-0.8	(-2.1, 0.5)	-0.8		(-2.1, 0.5)	5.1	-1.1		5.1	-1.1	
≥ 1 age disparate partnership												
Baseline (N=498)	7.4	0.					4.2	0.		4.2	0.	
Endline (N=430)	6.1	-0.7	(-2.0, 0.7)	-0.3		(-1.7, 1.1)	3.9	-0.1		3.9	-0.1	
≥ 1 transactional relationship												
Baseline (N=500)	23.4	0.		0			14.8	0.		14.8	0.	
Endline (N=432)	13.2	-5.1	(-7.1, -2.8)	-5.7		(-8.0, -3.5)	23.7	4.4		23.7	4.4	

<sup>a</sup>Adjusted for age and asset index

Directly engaging sexual partners or directly addressing poverty, education, or community gender norms may be more effective [18–23]. A final potential shortfall is that our intervention did not address underlying mental health issues, which nearly half of our cohort suffered from [24]. Similar work suggests that small-group interventions that combine mental health and behavioral principles are more effective than addressing either element alone [25].

Our findings are part of a complex body of evidence surrounding small-group behavioral interventions in AGYW. The underlying conceptual foundation of these interventions is that structural conditions (e.g. poverty, gender norms), lead to risky sexual behaviors (e.g. age-disparate relationships, transactional sex) that ultimately lead to high HIV incidence and other adverse SRH outcomes. Although a range of small-group interventions have successfully altered some risky sexually behaviors, none has altered multiple sexual behaviors substantially, and small changes in behavior often have not led to meaningful changes in sexually transmitted infections. For example, SISTA South Africa influenced the frequency of sexual activity, but only modestly, and this did not result in lower sexually transmitted infections [13]. Population Council’s small-group empowerment sessions led to reductions in transactional sex, but not to pregnancy or other sexual behaviors. Given the differences in these interventions, populations, and methodologic approaches it is difficult to determine which aspects of these interventions promote behavior change. However, it is possible that small-group interventions address, but do not fundamentally alter structural issues.

Intervention fidelity considerations (dose, adherence and quality) may have played a role in these flat findings. Dose was assessed by the number of sessions attended and was high in both intervention clinics, though higher when a cash transfer was provided. In our per protocol analyses that accounted for dose we did not observe stronger effects among those who attended more sessions, suggesting dose was not the primary driver. Adherence and quality indicators were not formally measured, but attempts were made to ensure facilitators adhered to the curriculum and delivered sessions in a high quality manner. We selected young female facilitators (20–30 year old) with strong interpersonal skills and experience in similar programs who came from these catchment areas. They were then intensively trained in the intervention goals and content and observed session implementation prior to implementing it themselves. Finally, they were observed conducting the intervention by a senior research officer who provided constructive criticism to each person to ensure faithful delivery of each session. Nonetheless, it is possible that the skill level required for intervention delivery exceeded the skill level of these young facilitators, or that more practice and feedback were needed. Given the short time-frame of the study, a pilot assessment was not

possible. It was also observed anecdotally that participants did not adhere to the at-home components, suggesting participants were not implementing what they learned.

Methodological considerations and limitations may have played a role in these findings as well. First, we lacked the resources to conduct a cluster randomized trial, the ideal design for addressing our research questions. Although we attempted to enroll comparable cohorts at each clinic, there were population-level differences between clinics in many baseline variables. We addressed this limitation by controlling for important variables of interest, but there may be some residual confounding. Next, we did not have sufficient statistical power to explore whether age-group, parity, marital status, or HIV status moderated the effectiveness of the intervention. Finally, we conducted an endline assessment at 1 year, but no post-intervention assessment. If the intervention had a delayed effect on these behaviors, it would have been missed by this analysis. This is especially noteworthy as many of the sessions addressing finances and the risks of transactional relationships occurred towards the end of the year, and the questions assessing transactional sex and age-disparate sex referred to a 1-year period.

In contrast, Girl Power-Malawi demonstrated that the model of youth-friendly health services had a profound impact on service uptake on this same population [17]. The juxtaposition of very positive findings surrounding the YFHS model and null findings surrounding the behavioral intervention suggest that offering SRH services to young women who engage in risky relationships may be a more promising approach to addressing HIV risk. This is especially noteworthy given that administering the sessions were labor-intensive and logistically challenging.

## Conclusion

There is an urgent need to address the complex web of vulnerabilities AGYW face in sub-Saharan Africa. This analysis suggests that although conceptually compelling, small-group behavioral interventions aimed at changing sexual risk behaviors were not sufficient to change these behaviors over the 1 year period under observations. Providing youth-friendly health services while addressing structural and contextual vulnerabilities in other ways is more promising.

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## Compliance with Ethical Standards

**Conflict of interest** Authors NER, MWG, DV, TP, NLB, LGB, and AEP declare that they have no conflict of interest.

**Research Involving Human and Animal Participants** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent or assent was obtained from all individual participants included in the study.

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