TBM

ORIGINAL RESEARCH

Translation and sustainability of an HIV prevention intervention in Lusaka, Zambia

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Abstract

The scale-up of HIV treatment programs in sub-Saharan Africa necessitates creative solutions that do not further burden the health system to meet global initiatives in prevention and care. This study assessed the work environment and impact of providing a behavioral risk reduction intervention in six community health centers (CHCs) in Lusaka, Zambia; opportunities and challenges to long-term program sustainability were identified. CHC staff participants (n=82) were assessed on perceived clinic burden, job satisfaction, and burnout before and after implementation of the intervention. High levels of clinic burden were identified; however, no increase in perceived clinic burden or staff burnout was associated with providing the intervention. The intervention was sustained at the majority of CHCs and also adopted at additional clinics. Behavioral interventions can be successfully implemented and maintained in resource-poor settings. Creative strategies to overcome structural and economic challenges should be applied to enhance translation research.

Keywords

Zambia, Translation, Intervention, HIV, Staff burnout, Clinic burden

Implications

Policy: Behavioral interventions should be integrated into the existing health delivery system as an essential component of HIV prevention packages.

Research: Future translational research should include the development of strategies to implement large-scale prevention initiatives in community health clinics that do not add to clinic burden.

Practice: Creative strategies to overcome structural and economic challenges, such as the train-the-trainer model, may be utilized to successfully implement interventions.

INTRODUCTION

High rates of HIV and shortages of health care workers have disrupted the provision of health care across sub-Saharan Africa [1–5]. In Zambia, nearly one million persons are living with HIV/AIDS (PLWH); the national HIV prevalence is 13.5 %, with rates as high as 17 % in the capital province of Lusaka. Scale-up of antiretroviral medication distribution has achieved 72 % coverage of the eligible population [6]. But as HIV treatment and prevention programs expand, strategies are needed that will not overburden the existing healthcare system.

Community health centers (CHCs) in Zambia vary in size; urban centers may serve catchment areas of 50,000 to over 100,000 persons. Rural CHCs may typically serve 1,000 to 8,000 enrolled patients, providing inpatient and outpatient adult and pediatric medical care, and labor, delivery, and maternal health services [7]. CHCs provide the majority of services for HIV prevention and care, i.e., HIV counseling and testing, prevention-of-mother-to-child transmission (PMTCT), medical male circumcision (MMC), and distribution of no-cost medication for antiretroviral therapy [6]. In response to the increasing need for HIV treatment and prevention services in resource-limited settings faced with health care provider shortages, the Zambian Ministry of Health instituted an integrated program of task shifting [5, 8–13]. Using task shifting, CHC workers, typically PLWHs, were thereby trained as expert patients to provide basic HIV treatment adherence and psychosocial support [14].

CHC staff in Zambia and throughout and sub-Saharan Africa have reported over-work and burnout [3], poor work environments [2], and risk of occupational transmission of HIV and stress [10]; all of which have been implicated in high staff attrition. HIV-related illness and mortality among CHC employees have depleted staff available for patient care [3, 4], and CHC staff report struggling with insecure employment status and insufficient pay, both of which impact morale and job performance and contribute to absenteeism [15]. Overall, these factors contribute to poor staff retention and threaten the quality and continuity of service delivery, limiting optimal engagement and retention of patients in long-term HIV care [3].

Behavioral interventions are an effective HIV treatment and prevention strategy that have been successfully implemented into community settings in the USA [16] and a variety of contexts across sub-

Saharan Africa [17]. When integrated into existing HIV counseling and testing (HCT) services, evidence-based behavioral interventions have successfully enhanced the practice of protective behaviors associated with reduced HIV transmission and infection [18, 19]. CHCs may employ trained, certified community health workers (e.g., HIV counselors who have completed the 12-month training required for certification, or trained nurses who completed a 2-year licensed practical nursing degree) available to implement interventions on a large scale [20, 21], or utilize existing staff, doctors, clinic officers, nurses, HCT counselors, trained to provide interventions. Skill building workshops have been used to achieve an expanded scope of practice for clinic staff [22–25].

However, the sustainability of these strategies, specifically within resource-limited and community-based settings, relies upon dedicated resources, as these interventions typically do not include changes to the structural and financial limitations of the setting [26]. The maintenance of behavioral intervention programs in CHCs in low and middle income countries may therefore be influenced by systemic factors (e.g., funding, health mandates), contextual factors (e.g., clinic burden, space, patient volume, staff- turnover), and individual factors (e.g., staff burden, salaries, burnout, and job satisfaction). The retention of clinic staff trained to implement and maintain new programs is thus a key limitation to their sustainability [2–4, 10, 15].

The Partner Program is an evidence-based HIV risk reduction behavioral intervention for HIV seropositive and serodiscordant couples [27–29] conducted from 2008 to 2013, aimed to test the feasibility of translating and sustaining this intervention using a staged HIV intervention technology transfer process [30]. The purpose of the current mixed-methods study was to identify site-specific characteristics that might facilitate or inhibit the translation process in CHCs in Lusaka, Zambia. This study sought to (a) characterize the work environment in Lusaka CHCs participating in the Partner Program translational research study; (b) assess the relative impact of task shifting to provide the behavioral risk reduction intervention on individual factors (staff burnout and job satisfaction, and perceived clinic burden) within the CHC context; and (c) identify opportunities and challenges to long-term sustainability of such intervention programs in the CHCs.

METHODS

Prior to study onset, ethical review and approval were obtained from the University of Miami Miller School of Medicine Institutional Review Board and the University of Zambia Research Ethics Committee, in accordance with the provisions of the US Department of Health and Human Services and the Zambian Ministry of Health. Prior to study onset, approval for the study was obtained from the Zambian Provincial Health Office for Lusaka Province. Letters of approval were then obtained from the Lusaka Health District in order to conduct this study at Lusaka District urban CHC sites.

Site preparation

Sites

CHC sites were selected to participate in the study in conjunction with the Lusaka Health District. Site surveys were conducted, and discussions were held with CHC Clinical Officers, Sisters in Charge, and HIV/AIDS program staff. Inclusion criteria for CHC required clinics to be located in urban Lusaka, to have space for treatment and assessment activities and to have HIV testing services due to their relevance to study outcomes. In accordance with the staged technology transfer procedure outlined by Kelly and colleagues [30], clinics were also required to have adequate HIV seropositive patient census to be representative of the larger urban population (minimum of 150 HIV seropositive or serodiscordant couples currently being seen at the site), to be willing to participate in the study for 5 years, and to make a commitment to offer the Partner Project as a CHC program using onsite health care providers trained by project staff during the study period.

Staff

Clinic staff were selected by the Sister in Charge as intervention facilitators based on specific characteristics identified as essential to program delivery. Candidates were identified who had the ability to model communication skills, to provide constructive feedback, and to engage in role playing exercises. In addition, facilitators were anticipated to be able to establish trust, encourage involvement in discussion, and to create a sense of shared ownership of health behavior change. Finally, facilitators were expected to maintain a safe, respectful environment and to have necessary management skills to deal with "difficult" participants (e.g., dominant, inflexible) [31, 32]. Facilitators recruited to participate in the study were CHC staff trained as HIV/VCT counselors, nurses, or clinic officers available to participate in Partner Project training and follow-up clinical supervision. CHC staff that participated in the study were compensated for their time (20 intervention sessions, ~US$100; assessments, ~US$5).

Training

CHC trainee facilitators participated in a week-long training workshop, focusing on intervention session content and group facilitation skills. Experienced University of Zambia research staff from the original

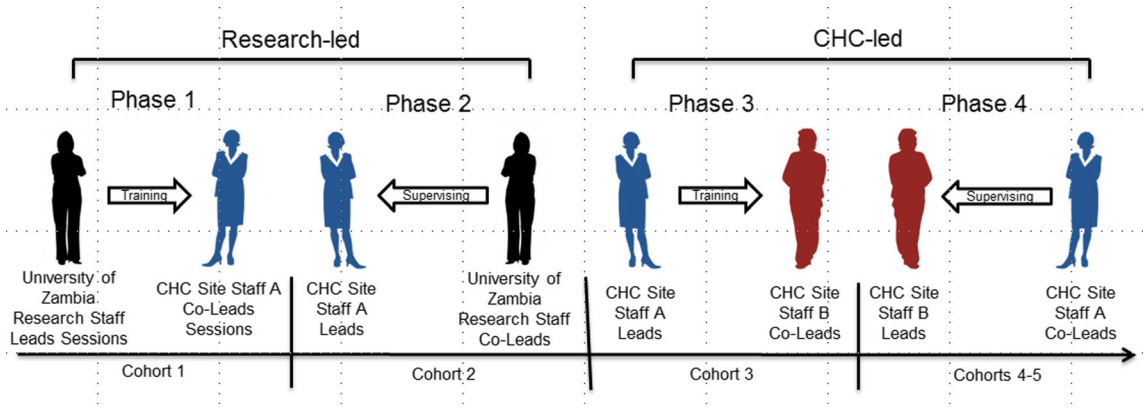

Fig 1 | The "train-the-trainer" model

Partner Program pilot project [33, 34] were used to train the CHC interventionists (n=12). One male and one female CHC staff member from each participating CHC were trained using a manualized intervention protocol. The "train-the-trainer" model (see Fig. 1) was employed in the training of interventionists; training was "time-lagged" to systematically train all providers at the six CHCs sequentially. Following the initial training workshop, research staff were assigned to conduct the intervention with the first cohort (eight per gender-concordant group) as leaders, with CHC staff functioning as co-leaders. After completion of the first cohort of four group sessions over a month period, the research and CHC staff switched roles for the next cohort, with CHC staff serving as group leaders and research staff serving as co-leaders. Research staff provided real-time clinical supervision to CHC staff. The final three cohorts (for a total of five per CHC) involved only CHC staff as group leaders, who then also served as trainers for additional CHC staff (n=12), by serving as co-leaders and providing feedback to new trainees. A total of 24 CHC staff interventionists were trained (n=12 research trained, n=12 CHC trained). Research staff continued their involvement conducting quality assurance and review of session audiotapes, providing follow-up support (e.g., weekly feedback from audio-recorded intervention sessions to ensure fidelity to intervention protocol and appropriate use of group therapy techniques).

Implementation

Quality assurance was assessed at every clinic for all four cohorts of participants attending the intervention. A random sample (10 %) of sessions at each clinic was recorded, reviewed, and rated using a checklist to evaluate the provision of key study elements in each of the four sessions. Ratings indicated that in cohort 2, the first CHC lead cohort, providers delivered 90 % of intervention elements, and in cohorts 3 and 4, the CHC lead and co-lead cohort, providers delivered 75 % of intervention elements. The majority of facilitators led two or more interventions and conducted an additional session, training a second facilitator. Periodic visits and regular conference calls were held with all sites to guide strategies to enhance sustainability. Regular reports derived from clinic data and qualitative summaries were provided to track the clinic progress.

Intervention

The Partner Program was designed to reduce risk of HIV/STD transmission and re-infection among Zambian HIV seroconcordant (positive) and discordant couples by increasing sexual barrier knowledge, acceptability, and use. The intervention employed gender-concordant, cognitive behavioral skill training groups that met once weekly over the course of a month (n=4 sessions, eight participants per male or female group). Intervention topics addressed HIV transmission, reproductive choice, medication adherence, communication, conflict resolution, sexual negotiation, and the acceptability and use of sexual barrier products (i.e., male and female condoms). The Partner intervention has been described in previous literature [16, 29].

Measures

CHC staff participants (n=82) completed assessments on the characteristics of the clinic environment, job satisfaction, burnout at baseline, midpoint (6–9 months post-baseline), and at clinic site intervention endpoint (12 months post-baseline). In order to assess both staff working with the intervention and existing non-engaged staff, clinic staff assessed included those staff providing the intervention and those staff working at the clinic providing HIV care. Assessments were completed using the Audio Computer Assisted Self Interview (ACASI) using a convenience sample of CHC interventionists (n=12) and CHC staff identified by the CHC Sister in charge at each clinic (n=70) who were not conducting the intervention.

Table 1 | Employee-reported clinic characteristics

Characteristic	*n*(%)
Number of patients attending clinic per day	
‹25	2(2 %)
≥25	80(98 %)
Number of clinic employees leaving per year (turnover)	
1–3	51(62 %)
4–5	5(6 %)
›5	26(32 %)
Frequency of sharing workspace	
Often/always	61(74 %)
Sometimes	17(21 %)
Never/rarely	4(5 %)
Number of staff members sharing space (*n*=80 sharing space)	
‹5	39(49 %)
≥5	41(51 %)
Frequency of low-income clients	
Often/always	46(56 %)
Sometimes	34(42 %)
Never/rarely	2(2 %)

Health center staff and facility

Community health center characteristics were assessed using a 12-item scale, assessing the length of time employed at clinic, employee turnover, availability and sharing of space, overcrowding, patient volume, and perceived difficulty completing daily tasks in the clinic environment (Vamos, unpublished instrument). Responses were "always" to "never," for some questions and numerical responses for other questions. Seven items which measured clinic burden subjectively (e.g., "I don't have enough space to do my job," "Overcrowding is always a problem at my clinic", see Table 2) were combined to create a perceived clinic burden subscale. Possible scores on the perceived clinic burden scale range from 7 to 35, with higher scores indicating higher levels of perceived burden.

Burnout

Burnout was assessed using a modified version of the Copenhagen Burnout Inventory [35]. The assessment was an 18-item inventory assessing personal, work-related, and patient-related burnout. Responses were on a Likert-type scale, ranging from 1 ("Not at all") to 5 ("Very much"), summed to create a total burnout score. The range of potential scores was 18–90, with higher scores indicating higher levels of burnout. The Copenhagen Burnout Inventory demonstrated high internal consistency (Cronbach's α=.86).

Job satisfaction

Job satisfaction was assessed using a modified version of the Job Satisfaction Survey [36]. The survey assessment consisted of 18 items assessing satisfaction with aspects of work (e.g., pay, supervision, benefits, operating procedures, co-workers). Responses ranged from 1 ("Disagree very much") to 6 ("Agree very much") and total scores ranged from 18 to 108. Higher scores indicate higher levels of job satisfaction. Cronbach's α for the total job satisfaction survey was 0.91.

Retention/sustainability

In order to assess intervention sustainability, retention of interventionists and clinic staff was assessed. Data was collected from CHC sites on current employment status of participating CHC staff, and the reasons for discontinuing employment (e.g. transfer, study leave, retirement). The number of cohorts conducted by each interventionist was recorded, in addition to the continued provision of the intervention post-study completion at the CHC.

Statistical analyses

Descriptive statistics (e.g., frequency, mean, standard deviation) are reported for participant demographics and clinic characteristics. Changes in perceived clinic burden, job satisfaction, and burnout over time were assessed using mixed models. In each analysis, CHC staff members providing the intervention were compared with CHC staff not providing the intervention over time to assess the relative impact of task shifting to accommodate intervention provision. Predictors in the models included task (CHC staff providing the intervention vs. CHC staff not providing the intervention), time, and the interaction between task and time. If the interaction between time and CHC role was significant, pairwise comparisons between time points were conducted within each group. No adjustments were made for multiple comparisons. All analyses were

Table 2 | Perceived clinic burden

Characteristic	*n*(%)
Do you have enough space to do your job?	
Yes (always, often)	39(48 %)
Sometimes	20(24 %)
No (rarely, never)	23(28 %)
Is overcrowding a problem at your clinic?	
Yes	53(65 %)
Sometimes	25(30 %)
No	4(5 %)
Are your clients difficult to work with?	
Yes	7(8 %)
Sometimes	67(82 %)
No	8(10 %)
Do you and your colleagues work well as a team?	
Yes	68(83 %)
Sometimes	13(16 %)
No	1(1 %)
Does your clinic have sufficient funds for necessary activities?	
Yes	9(11 %)
Sometimes	39(48 %)
No	34(41 %)
Is there enough time each day to complete all tasks?	
Yes	23(28 %)
Sometimes	38(46 %)
No	21(26 %)
Number of patients assisted per day	
‹10	3(4 %)
10 to 15	7(9 %)
15 to 25	11(13 %)
≥25	61(74 %)

conducted using SAS 9.3 (SAS Institute, Cary, NC, USA).

RESULTS

Participants

Clinic staff (n=82) were employed in a variety of positions within the CHCs; certified nurse was the most common occupation (n=28, 34 %) followed by nurse midwife (n=13, 16 %) and HIV counselor (n=12, 14 %). Education levels ranged from year eight (n=1, 1 %) to some college or technical training in their profession (n=72, 88 %). The length of time staff had worked at their clinic at baseline ranged from less than 1 year (n=22, 27 %) to more than 10 years (n=12, 15 %).

Clinic characteristics and perceived clinic burden

Most community health centers employed over 25 people, and nearly all CHC staff members reported that more than 25 patients per day that utilized clinic services (n=80, 98 %). Most staff members indicated that their patients were low income (n=46, 56 %). Nearly three quarters shared their work space with others (n=61, 74 %), most with five or more people (n=41, 51 %). Employee turnover at the CHCs varied from one to more than five employees leaving per year. Staff-reported clinic characteristics are presented in Table 1.

Three quarters of CHC staff members reported assisting more than 25 patients per day (n=61, 74 %), and two-thirds indicated that overcrowding was a problem at their clinic (n=53, 65 %). Twenty eight percent (n=23) indicated that they did not have enough space to do their job. However, most staff members reported that they and their colleagues worked well together as a team (n=68, 83 %). Many indicated that their clinic did not have sufficient funds to complete necessary activities (n=34, 41 %). Frequencies of all individual items comprising the perceived clinic burden scale are presented in Table 2.

At baseline, the mean perceived clinic burden score was 46.39±5.22, and there was no difference between CHC staff providing the intervention and other clinic staff members (mean (interventionists)=25.25±4.11, mean (other staff)=25.63±4.03, $t(80)$=0.30, p=.77). Differences in perceived clinic burden between CHC staff providing the intervention and those with other tasks were examined over time. There was no change in perceived burden over time ($F(2, 112)$=1.15, p=0.32) and no difference in perceived burden over time between intervention providers and other clinic staff (F=0.38, p=0.69). Means and standard deviations for perceived clinic burden by task are presented in Table 3.

Table 3 | Perceived clinic burden, burnout, and job satisfaction over time

Parameter	CHC interventionists m(sd)	Other CHC staff m(sd)
Perceived burden		
Baseline	25.25(4.11)	25.63(4.03)
Midpoint	26.17(3.83)	26.12(3.45)
Study Completion	24.50(5.02)	26.07(3.51)
Burnout		
Baseline	52.75(12.02)	51.97(14.39)
Midpoint	53.08(13.83)	53.11(15.08)
Study Completion	55.10(12.92)	49.84(12.80)
Job satisfaction		
Baseline	73.92(4.84)	67.79(9.53)
Midpoint	77.58(9.80)	66.98(9.74)
Study Completion	71.10(9.86)	70.02(9.24)

Burnout and job satisfaction

At baseline, the mean job satisfaction score among all staff members was 68.68±9.23, and mean burnout score was 52.09±14.01. Higher levels of baseline job satisfaction were observed among those 12 staff members providing the Partnership II intervention compared to the other 70 clinic staff members (mean (interventionists)=73.9±4.8, mean (other staff)=67.8±9.5, $t(80)=2.17$, $p=.03$). However, there was no difference in burnout at baseline ($t=0.18$, $p=.86$). Job satisfaction was negatively correlated with burnout ($r=-.21$) although the relationship was not statistically significant ($p=.06$).

Differences in burnout and job satisfaction between clinic staff providing the intervention and those with other jobs in the CHCs were examined over time. Table 3 details the means and standard deviations for these variables. Over time, there was no change in burnout ($F(2, 112)=0.13$, $p=.88$) and no evidence of a difference over time by task (intervention provision vs. no intervention provision) ($F(2, 112)=1.01$, $p=.37$). Averaged over time, job satisfaction was higher for those who provided the intervention than for those who did not (mean (CHC interventionists)=74.21, mean (other staff)=68.72, $F(1, 80)=5.44$, $p=.02$). Additionally, there was evidence of a difference in changes in job satisfaction over time by task ($F(2, 112)=4.80$, $p=.01$). Further examination of this interaction demonstrated a decrease in job satisfaction from midpoint to study completion among those CHC staff members who provided the intervention ($t=2.84$, $p=.01$). Among the other employees of the CHCs, job satisfaction increased from midpoint to study completion ($t=2.05$, $p=.04$). Job satisfaction did not change from baseline to midpoint in either group.

Sustainability

Staff retention

Of the 82 CHC staff members participating in this study, 61 were still employed at their clinic following the completion of the study at their site. Among the staff members who were not still employed at their clinics, most transferred to work at another clinic ($n=6$), three took unpaid leave, two left for extended vacation, and one staff member retired. One of the clinics providing the intervention closed soon after completing the study; the clinic was re-opened at a new location. Of the ten staff members who had worked at this clinic, seven transferred to another clinic, one retired, one took study leave, and the final staff member became employed as the director of the newly formed clinic. Thus, by study completion, nine CHC staff members were not retained due to the closure of their clinic, and an additional 12 were not retained for other reasons (total not retained=21, 26 %).

Maintenance of the intervention

Following promising preliminary results of study translation at midpoint, funding was obtained by the University of Zambia Teaching Hospital to provide continued support for the provision of the intervention at the CHCs. Funding was also allocated for training and support for the implementation of the intervention in CHCs in all provinces across Zambia. This has been previously described by Weiss et al. (2011).

Thirteen CHC staff members continued to provide the intervention. Nine of the 13 (69 %) were part of the original 24 CHC interventionists; the additional four were trained by existing CHC interventionists and research staff. All clinics have staff trained to provide the intervention, including the re-opened clinic. To date, three of the clinics are actively providing the intervention, two are recruiting participants, and one clinic is pending implementation.

DISCUSSION

This study examined the feasibility of translating and sustaining an HIV prevention intervention in community health centers (CHCs) in urban Lusaka, Zambia. In characterizing the work environment, high levels of clinic burden, i.e., patient volume, limited resources, and space, were identified. However, no increase in perceived clinic burden and staff burnout or decrease in job satisfaction was found as

a result of providing the intervention. The intervention was sustained at the majority of participating CHCs and was adopted at additional clinics in the urban Lusaka region. Finally, although monetary incentives remain an important motivator for the execution of additional duties, support, educational and training opportunities provided opportunities for engaging staff in new HIV care programs in this community setting [5, 9].

While task shifting to take on new occupational responsibilities has been promoted to as a cost-effective method for increasing access to equal or enhanced quality of care and a strategy to enhance health outcomes among clinic patients, [37] few studies have documented the impact of this strategy on already overburdened HIV health workers. Clinics in sub-Saharan Africa have reported high levels of patient volume with limited resources, suggesting that the additional duties allocated through task shifting may add to the burden of health workers [38]. However, most staff participating in this study expressed high levels of job satisfaction and a perception of working well as a team within their facility. The motivation of staff to work effectively as a team despite financial and structural barriers may represent an important component in implementing and sustaining behavioral HIV prevention interventions at the community level. In addition, while this study identified overcrowding and scarce resources to provide services for predominantly low-income clients, clinic staff, under the guidance of clinic officers and sisters in charge, successfully identified space and resources to implement and sustain this intervention.

Though participating clinic staff were only modestly compensated for provision of the intervention; this remuneration appeared to underlie decreased job satisfaction when faced with the end of the program. Among those providing the intervention, a decrease in job satisfaction was observed concurrently with the removal of compensation following completion of the study. This is likely a reflection of the very low income earned by community health workers throughout sub-Saharan Africa [4, 39]. Financial constraints for support of health care facilities in resource-limited countries, such as Zambia, may be the primary impediment to adequate patient care and execution of additional tasks. Countries reliant on PEPFAR funding may be especially vulnerable to reductions in funding, which may further limit their resources for provision of HIV treatment and prevention [40].

High rates of HIV, staff turnover, and shortages of trained staff to provide newly identified interventions present a continuing challenge in sub-Saharan Africa. More than one quarter of all participating clinic staff were not retained at their clinic site. However, though retention of community clinic staff varied by clinic, retention did not appear to limit the implementation of the intervention. As staff moved to other clinics, additional clinic staff to replace those not retained were identified and subsequently trained by previously trained staff, using the train-the-trainer model. However, given retention rates, the prediction of sustainability of public health interventions in the community health context in low- and middle-income countries remains uncertain. Without post-study, extended follow-up after the completion of clinic activities, it is difficult to predict sustainability. Future studies should establish strategies to more adequately evaluation maintenance of new interventions.

Translational research, designed to move scientific discoveries into clinical practice, hinges on the availability of qualified and committed health care providers on the front lines of HIV community care to implement and maintain effective public health interventions. Innovative solutions must be identified to implement large-scale prevention initiatives. Studies in Zambia have previously employed creative strategies to overcome these structural and economic challenges, such as the train-the-trainer model utilized in this study. Future translation research should include the development of innovative strategies that can be integrated within the existing health delivery system, as has been recommended in the provision of the PMTCT protocol [13] and medical male circumcision. The integration of interventions into community health clinics is more likely to succeed when it does not add to the overall clinic burden. Despite these challenges, behavioral interventions can be an essential component of the HIV prevention package and can be successfully translated and implemented in resource-limited settings.

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