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The relationship of repeated technical assistance support visits to the delivery of positive health, dignity and prevention (PHDP) messages by healthcare providers in Mozambique: A Longitudinal Multilevel Analysis

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Abstract

Background: PHDP is Mozambique's strategy to engage clinicians in the delivery of prevention messages to their HIV positive clients. This national implementation strategy uses provider trainings on offering key messages and focuses on intervening on nine evidence-based risk-reduction areas. We investigated the impact of longitudinal technical assistance(TA) as an addition to this basic training.

Methods: We followed 153 healthcare providers in 5 Mozambican provinces over 6 months to evaluate the impact of on-site, observation-based TA on PHDP implementation. Longitudinal multilevel models were estimated to model change in PHDP message delivery over time among individual providers.

Results: With each additional TA visit, providers delivered about one additional PHDP message ($p<0.001$); clinicians and non-clinicians started at about the same baseline level but clinicians improved more quickly ($p=0.004$). Message delivery varied by practice sector; maternal and child health sectors outperformed other sectors.

Conclusions: Longitudinal TA helped reach the programmatic goals of the PHDP program in Mozambique.

Keywords

Positive Health, Dignity and Prevention (PHDP); Implementation research; Technical Assistance; multi-level models; Mozambique

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DECLARATION OF CONFLICTING INTERESTS

The Authors declare that there are no conflicts of interest.

INTRODUCTION

Mozambique has one of the world's highest HIV/AIDS burdens.[1] The national HIV prevalence is estimated at 11.5% among adults aged 15–49 years, with prevalence as high as 25% in some provinces.[1,2] Although from 2001 to 2012, Mozambique saw the incidence of HIV among adults fall by more than 25%, continued high prevalence rates demonstrate the need for additional prevention strategies to effectively reduce HIV transmission.[1]

The rapid scale-up of HIV care and treatment in Mozambique has provided an opportunity to engage people living with HIV (PLHIV) in strategies targeting the prevention of onward HIV transmission. Focusing prevention efforts on people who know their HIV status is crucial as this can reduce transmission of HIV to partners and children who are not already infected. Meta-analyses have suggested that interventions delivered in routine medical care settings significantly reduced sexual risk behaviors and may be ideal locations for behavior change counseling to reduce the onward transmission of HIV.[3] Such Positive Health, Dignity, and Prevention (PHDP) interventions have already been developed and tested in sub-Saharan African settings and have been found to reduce risky sexual behaviors and increase condom use.[4–8] Other studies have found that PHDP interventions are feasible to implement during routine clinical care and are acceptable to PLHIV in sub-Saharan African contexts.[5,9,10] In some cases, however, difficulties have been noted with intervention fidelity and high quality implementation.[11,12]

The PHDP framework guides clinical practice evaluation and improvement for treatment and prevention among PLHIV in Mozambique and is included in Mozambique's 2015–2019 National Strategic Plan for HIV/AIDS.[13,14] PHDP, which is known locally as Positive Prevention (PP), encompasses nine evidence-based approaches to reducing transmission, including addressing sexual risk and promoting condom use, supporting disclosure and partner testing, antiretroviral therapy (ART) adherence, screening for sexually transmitted infections (STIs), prevention of mother-to-child transmission (PMTCT) or offering family planning (FP), addressing the use of alcohol and drugs, referral to community support services and, addressing gender-based violence (GBV) (see Table 1).[15] PP training has been offered in Mozambique since 2006 and targets healthcare providers who see PLHIV during routine HIV care.

Reports of PHDP message delivery in clinical care settings in Mozambique suggested that after receiving PP training, some providers struggled with offering PP messages during their daily interactions with PLHIV. Dewing and colleagues in South Africa found a similar situation and reported that following a PP training, providers failed to reach full proficiency but benefited from refresher training and supervision.[11,16] Work by various researchers has suggested that in order to achieve and maintain proficiency with HIV prevention counseling and behavior change communication, more intensive training as well as follow-up technical assistance (TA) may be needed.[12,17] Effective strategies that improve the implementation of PP are desperately needed to improve clinical care and reduce HIV transmission.

Therefore, in order to support the implementation of PP in Mozambique, we provided on-site, observation-based TA to providers following a three-day PP training workshop. We

evaluated the impact of TA implemented over six months on the delivery of accurate PP messages. We hypothesized that on-going TA would increase the delivery of PP messages over-time. By assessing the impact of on-site TA, we hoped to learn lessons and develop best practices that would help refine TA approaches to ultimately improve HIV provider prevention counseling for PLHIV.

METHODS

Sample.

The study population was healthcare providers who offer care and treatment to PLHIV at health facilities in Mozambique. For this evaluation, providers were defined broadly to include Physicians, technicians providing either comprehensive (Medical Technician) or basic (Agente) medical care, maternal and child health nurses, general nurses, psychologists, psychiatric technicians, counselors, and midwives. Although their educational backgrounds and job functions differed, these various cadres were chosen to receive PP training because they represent the various types of healthcare workers who have contact with and provide services to the client population. In total, 153 healthcare providers at 39 health centers in 5 provinces took part in this study. This final sample consisted of 103 clinicians and 50 non-clinicians.

To be eligible, providers had to be at least 18 years old and fluent in Portuguese (both minimum job entry requirements in Mozambique), have participated in a PP training, and be regularly providing care to PLHIV. Observed interactions also required that the client be 18 years of age or older, HIV-positive, and provide assent for their consultation to be observed.

Evaluation sites were drawn from five of Mozambique's 11 provinces (Maputo City, Maputo Province, Gaza Province, Inhambane Province, and Zambézia Province) and were all MOH clinics. Each site was chosen because it employed healthcare providers who had received the PP training, was located in a province with a high HIV prevalence, and was deemed a priority by the provincial department of health. Within each health center, providers were recruited from priority health sectors that included Maternal and Child Health, Maternity, Psychosocial Support, adult and adolescent HIV counselling and testing, integrated consultations (where PLHIV access HIV care and treatment), and the National Program to Control Tuberculosis (TB). At each health center, all providers in the priority health sectors were recruited to take part in the evaluation. Providers in other sectors of the health center (for example, laboratory or pharmacy) were not part of this evaluation although PP training was provided to all healthcare providers at the health center. All providers who were recruited took part in the evaluation.

Data collection.

Data collection took place from March through September 2013. The evaluation approach consisted of one PP project member trained in monitoring and supervision visiting an implementation health center to observe trained healthcare workers in their clinical visits with at least three clients. During each observed provider-client interaction, the trained staff member would be present in the consultation room and would note the PP messages that

providers accurately and completely offered to clients during the session, as well as messages that were not complete or accurate. All data was collected on paper-based TA checklist forms by trained project staff. The TA staff member did not interact with the client or comment during the client consultation. Directly following the conclusion of each observed provider-client session, the trained staff member would provide feedback to the provider about areas in which they excelled as well as areas for improvement. PP staff members were all PP curriculum and training experts and were highly knowledgeable of all PP messages and strategies for integration during clinical care. Following TA visits, data from paper-based forms were entered into a custom-designed database (CS Pro) and then cleaned and aggregated by data analysts.

Measures.

Mozambican PP technical staff members developed all evaluation measures and data collection tools in collaboration with researchers from the University of California, San Francisco. New measures were created to assess PP message delivery as no existing tools measured delivery of PP messages. After initial item generation, content validity was established by submitting the scale to HIV care and PP experts. The scale was pilot tested with a sample of PLHIV from the catchment area that met eligibility criteria to ensure face validity and to assess understanding, cultural relevance, and language clarity. Following pilot testing, the scale was further refined. These approaches provided confidence in the comprehensiveness of the new scale. The final scale contained nine items with four response categories (ie: message given correctly and completely, message given incompletely, message given incorrectly, message not given).

Provider variables recorded by the evaluation staff members included: sex (female/ male), professional category (physicians, medical technicians, agentes, maternal and child health nurses, general nurses, psychiatric technicians, midwives, counselors, and psychologists), province, health center name, and health center sector where the provider delivered services (Maternal and Child Health/ Maternity, Psychosocial Support, adult and adolescent HIV counselling and testing, integrated consultations and the National Program to Control TB). Since we hypothesized that there might be differences in message provision based on professional category, we used the provider professional category information to construct a variable for clinical category that was coded as clinicians (ie: physicians, medical technicians, agentes, maternal and child health nurses, general nurses, psychiatric technicians, and midwives) and non-clinicians (ie: counselors and psychologists). In assessing providers during client interactions, client variables including sex (female/ male) and ART status (on ART/ not on ART) were recorded.

The main outcome of interest was whether each PP message was delivered completely (risks and alternatives clearly explained by service provider) and accurately (informational content was accurate) to the client at any point in the observed consultation. Each PP message was coded as a binary variable (message given accurately and completely [yes=1] and message not given (at all or not accurately) [no=0]). A sum score was then created as a measure of message delivery success with higher scores reflecting higher correct message delivery. The score ranged from 0 to 9 reflecting the nine possible PP messages that could be given [1)

sexual risk assessment and condom distribution, 2) sero-status disclosure and partner testing, 3) treatment adherence, 4) STIs, 5) family planning, 6) PMTCT, 7) drug and alcohol use, 8) community support services, and 9) gender-based violence].

Design.

This evaluation utilized a non-experimental, prospective, longitudinal cohort design to examine provider ability to accurately and completely offer PP interventions during day-to-day interactions with PLHIV. All recruited providers were observed and had received the PP training. There was no control condition. All providers at evaluation health centers had been trained regardless of their clinical category. However, laboratory and pharmacy staff were not included in this evaluation as they are less likely to offer PP messages in their regular interactions with PLHIV. Not including these health center staff likely improves the observed level of PP message delivery.

Analyses.

Analyses were conducted with STATA version 13.1 (StataCorp LP, College Station, TX). Descriptive statistics were used to characterize the sample, inspect the distributions of main variables and examine for differences in providers observed over the full study versus those who were lost to follow-up. Longitudinal multilevel models with random intercepts for individual healthcare providers were estimated to determine if implementation of key messages changed over time and if change over time was dependent on professional category, provider sex, sector where the provider offers services or patient factors while adjusting for the nested nature of data (repeated observations nested within individual providers). In these models, time is represented as the number of TA exposures (1 to 5), which were implemented generally in 5-week cycles.

Ethics.

All procedures were reviewed by the Committee on Human Research at the University of California, San Francisco (UCSF), the IRB at the University of Washington, the US Centers for Disease Control and Prevention (CDC) Division of Global HIV/AIDS, and the Comité Nacional de Bioética a Saúde in Mozambique, with the determination that written consent from providers was not required as the activities described were considered quality improvement. However, verbal assent from provider and any client observed was confirmed prior to engagement in any TA procedure. Providers could decline TA or stop TA at any time without consequence.

RESULTS

In total, 153 healthcare providers were followed at 39 health centers in 5 provinces. The sample consisted of 103 clinicians and 50 non-clinicians. The majority of providers were female (68%), 67% were clinicians, and 35% were providing care during integrated consultations (where most PLHIV access HIV care and treatment services). Just over half (55.6 %) of the clients being seen by the healthcare providers were women and almost half (47.7%) were on ART (see Table 2). Across all data collection time points, PP messages were delivered an average of 3.05 (SD=1.48) times per client.

Modeling the impact of TA.

As indicated in Table 3, Model 1, the impact of exposures to TA was important for the successful implementation of the PP program. Specifically, the baseline number of messages delivered (2 messages) increased by an additional message for each additional TA visit ($p<0.001$). Independent variables including provider sex, the sector the provider works in at the health center, client sex, and client ART status were evaluated for impact on the number of correct PP messages delivered (Table 3, Model 2). The only significant findings for this multivariable model were for time, professional category, and sector. With each additional TA visit, providers delivered just under one additional PP message: clinicians offered almost one PP message less as compared to non-clinicians ($p=0.058$). In addition, providers in the integrated consultations sector as well as TB sectors delivered fewer messages than providers in the maternal and child health and maternity sectors. The interaction of time and provider professional category was also significant ($p=0.004$), suggesting that clinician message delivery improves more quickly than non-clinicians as TA sessions accumulate over time (see Figure 1).

DISCUSSION

In this study, we examined the impact of an implementation improvement strategy that could be used in various settings. Overall, longitudinal TA was shown to increase the frequency of accurate and complete PP message delivery implemented during routine practice within low resource, public sector clinics in Mozambique. In addition to TA visits, the strongest predictor of PP message delivery following training was the sector where the provider offered services. Providers in the integrated consultations and TB sectors delivered fewer messages than providers in the maternal and child health and maternity sectors. Additionally, provider professional category (whether the provider was a clinician versus a non-clinician) was significant and suggested that clinicians may be slightly worse than non-clinicians at delivering PP messages at baseline but that over time, clinicians improve their PP message delivery more quickly than non-clinicians. These results support the value of on-site observation based repeated TA for improving provider competency and the importance of providing ongoing technical support during implementation in order to improve PP message delivery by various types of HIV care providers.

In this analysis, the mean number of PP messages delivered was three messages. Full implementation of the PP intervention is the provision of eight prevention messages. Therefore, on average, providers were not reaching full intervention implementation. Other HIV prevention counseling studies have also found that providers may have difficulty achieving full proficiency with prevention interventions and techniques.[18–20] Transferring evidence-based practices into real-world settings can present implementation challenges and barriers.[9,16,18,21–23] Furthermore, it may be unrealistic outside of study settings to expect near-perfect implementation.[17] For example, structural barriers such as limited time and space for counseling, high client load, and frequent staff turnover, have been noted in South Africa and Mozambique.[9,16,18]

The models presented also suggest that individual provider characteristics do not make a substantial impact on PP message delivery. As it relates to HIV service provision, this lack

of a provider effect may mean that providers are delivering PP messages based on their clinical judgment. This is reasonable and suggests that providers may be delivering only those messages they felt were pertinent to a given client, versus implementation of all messages regardless of current client needs. Such an adaptation would arguably be more consistent with tailored approaches, such as patient-centered counseling. Tailoring the intervention to the specific needs of the target population may improve the fit of the intervention and may also promote maintenance and implementation over time.[23–26] This finding suggests there is an opportunity to impact provider clinical practices over time.

With each additional TA visit, providers delivered about one additional PP message, showing steady improvement over time. TA has generally been found to be associated with more effective implementation following the initiation of new programs[17]. One strength of the TA support provided was that it was offered shortly after the initial training and it was delivered repeatedly over time in the providers' practice environment. Similar interventions have shown that training alone is not enough to ensure fidelity and implementation of PP interventions[11] and have also suggested that TA can improve message provision over time, therefore allowing providers to address more PLHIV prevention needs.[12] Since the transfer of learned skills into practice is an ongoing process that is influenced by the work environment[27], regular supervision incorporated in the context of the daily work environment may help to reinforce competencies as providers learn how to implement PP during regular care.

Our results also suggest that although clinicians and non-clinicians may start at slightly different levels of PP message delivery at baseline, clinicians improve their PP message delivery at a more rapid pace than non-clinicians. It is possible that clinicians may feel more comfortable delivering biomedical messages (such as about STI treatment or FP method provision)[28] and this may aid in their faster improvement. However, not all PP messages are clinically based and many focus on psychosocial support (such as messages about referrals to community support services or addressing GBV). Although messages offered by clinicians can be especially effective at impacting the transmission risk behaviors of PLHIV[29], it is necessary to find approaches for discussing risk behavior and prevention that are acceptable to providers regardless of clinical cadre. All providers should be encouraged to discuss all PP messages with their clients and develop comfort providing both biomedical and behavioral prevention messages, as this is an important opportunity to prevent HIV transmission.

These findings should be interpreted in light of some limitations. As this was a longitudinal study, evaluating provider practice and not clients, we did not track client data. It is possible that the same client could have been seen multiple times adding an additional level of clustering to the data. Given the varied observation schedules, we do not suspect that this occurred often. Additionally, the data for this study comes from consultations with PLHIV clients observed by trained Mozambican PP staff members. Since counseling sessions were observed, it could be argued that the results may be overly favorable as the presence of an observer would likely cue providers to implement messages. While this is possible, all observation data was collected in the same manner over time, and we did have variability in the data collected. Thus, for most providers the presence of the PP team member did not

produce “perfect” performance. Finally, there was no control group or comparison condition. It is possible that provider PP message delivery would have improved over time in the absence of TA. However, other studies have found that following trainings, providers benefit from refresher training and supervision,[11,16] suggesting that TA provides an added enhancement in HIV prevention counseling.

CONCLUSION

In this analysis, we report the results of an effective implementation improvement strategy. Overall, longitudinal TA steadily increased the frequency of PP message delivery in Mozambique. While these results are encouraging, there is still much to be explored in order to know whether the PP intervention can reduce transmission risk behavior since the delivery of PP messages does not necessarily translate into patient behavior modification. Moreover, whether all PP messages are indeed needed or if changes to the PP approach represent valuable adaptations to client needs should be carefully evaluated. In order to maintain the gains noted here, ongoing support is needed to achieve full integration and to ensure the delivery of PP with good quality. Given ongoing supervision that is tailored to the needs of providers, additional follow-up should continue to build competence and enable providers to deliver PP counseling that can address the prevention needs of PLHIV and ultimately reduce HIV transmissions.

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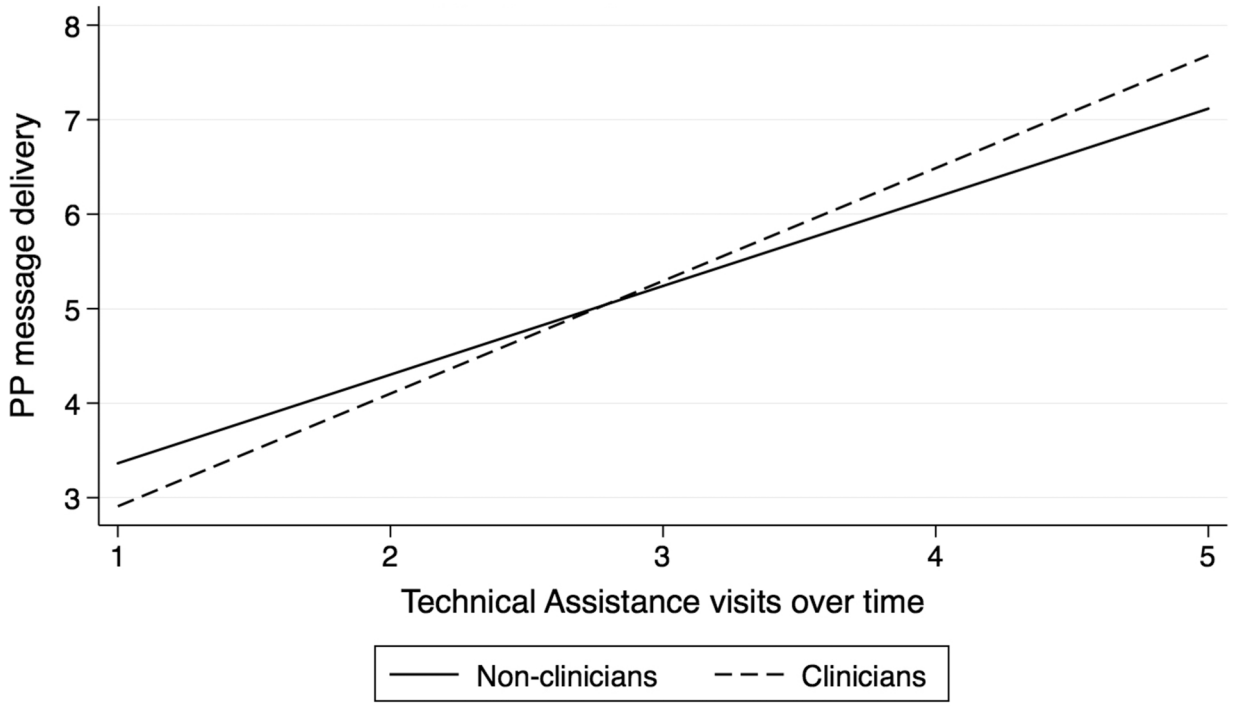

FIGURE 1.
Delivery of PP Messages over time disaggregated by provider clinical status

Table 1:

PP messages

PP message	Description of message
1. Addressing sexual risk and promoting condom use	• Risk behavior assessment • Discussion of risk factors • Options for risk reduction • Provide condoms
2. Supporting disclosure and partner testing	• Advantages of disclosure • Disclosure support • Evaluate partner serostatus • Importance of partner testing • Addressing serodiscordance
3. Antiretroviral therapy (ART) adherence	• Importance of adherence • Adherence assessment • Support for adherence
4. Screening for sexually transmitted infections (STIs)	• STI screening • Treatment of STIs • Invitation of partner to STI treatment Referral
5. Prevention of mother-to-child transmission (PMTCT)	• Need for PMTCT • Importance of PMTCT • PMTCT messages
6. Offering family planning (FP)	• Evaluation of possible pregnancy • Need for FP • Referral for methods when necessary
7. Addressing the use of alcohol and drugs	• Screening for signs of alcohol and/or drug use • Risks associated with alcohol and other drugs • Messages for reducing consumption of alcohol and other drugs
8. Referral to community support services	• Identifying needs for additional community support • Referral to community support groups
9. Addressing gender-based violence (GBV)	• Screening for signs of GBV • Support the victim • Referral for additional support

Table 2:

Demographics characteristics of providers and clients

	Mean (SD)
Correct and complete delivery of PP messages	3.05 (1.48)
PROVIDERS (n=153)	**n (%)**
Provider Sex	
Female	104 (68)
Male	49 (32)
Provider Cadre	
Clinicians	
Medical Technician	37 (24)
Maternal and Child Health Nurse	29 (19)
Agente	17 (11)
General Nurse	16 (10.5)
Psychiatric Technician	2 (1)
Midwife	1 (0.65)
Physician	1 (0.65)
Non-clinicians	
Counselors	47 (31)
Psychologists	3 (2)
Province	
Maputo Province	46 (30)
Gaza	35 (23)
Zambezia	30 (20)
Maputo City	26 (17)
Inhambane	16 (10)
Sector at Health Center where provider practices	
Integrated Consultations	54 (35)
Psycho-social support	40 (26)
Maternal and Child Health/ Maternity	29 (19)
TB Clinic	20 (13)
Adult/ adolescent counseling and testing	10 (7)
Sex of client	
Female	85 (56)
Male	53 (35)
No data	15 (10)
ART status of client	
On ART	73 (48)
Not on ART	71 (46)
No data	9 (6)

Table 3:

Relationship between TA visits (time), independent variables, and the interaction of provider professional category with the slope of the TA visit time trajectory with the number of correct PP messages delivered[1]

	Model 1			
Variable	**β**	**SE**	**t**	***p-value***
Technical Assistance visits (time)	1.084	0.037	29.04	**<0.001**
Intercept	1.973	0.140	14.09	**<0.001**
	Model 2			
Variable	**β**	**SE**	**t**	***p-value***
Technical Assistance visits (time)	0.920	0.063	14.57	**<0.001**
Provider is clinician	−0.907	0.478	−1.90	0.058
Time x provider category interaction	0.230	0.079	2.91	**0.004**
Sex of provider - female	−0.076	0.215	−0.36	0.722
Sector in health center				
Psycho-social support	−0.677	0.444	−1.52	0.128
Integrated Consultation	−0.558	0.274	−2.04	**0.041**
TB Clinic	−1.240	0.361	−3.43	**0.001**
Adult and adolescent counseling and testing	−0.824	0.537	−1.54	0.125
Client sex	0.176	0.132	1.34	0.180
Client ART status	0.136	0.138	0.98	0.325
Intercept	2.793	0.598	4.67	**<0.001**

[1]The intraclass correlation (ICC) for the null model was 0.092. An ICC of 0.092 means that 9% of the variation in PP message provision can be attributed to a healthcare provider effect.