Original Paper

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Implementing a Web-Based Intervention in HIV Primary Care Clinics: A Pilot Study on the Feasibility of Positive Health Check

Abstract

Background: Web-based interventions can help people living with human immunodeficiency virus (HIV) achieve better clinical outcomes and behaviors, but integrating them into clinical practice remains challenging. Several studies report on the appropriate content for web-based interventions and their outcomes, but there is a gap in understanding the feasibility of implementing these interventions in HIV clinic settings from the clinicians’ perspective.

Objective: We examined whether Positive Health Check (PHC)—a web-based, tailored video counseling tool—was acceptable, appropriate, and feasible for HIV primary care clinics to implement.

Methods: Four primary care clinics implemented PHC during a 1-month pilot. Nine key clinic staff across clinics who implemented the intervention participated in 54 interviews. We used framework analysis to code the data and identify themes related to implementation outcomes; acceptability, appropriateness, and feasibility. We also analyzed patients’ (n=104) intervention usage metrics to quantify patients’ intervention completion rates (n=68).

Results: At the start of implementation, and with increasing frequency as enrollment was opened to more diverse patient groups, clinic staff reported that PHC was an acceptable and appropriate intervention. Stakeholders successfully dedicated space for patients to use the tool, delivered patients’ handouts, and adjusted workflow to facilitate implementation. Clinic staff reported that PHC is feasible to implement in clinic settings, but challenges remained for workflow integration and the best time to administer PHC.

Conclusions: To increase implementation effectiveness, we examined implementation outcomes related to the integration of PHC into clinic workflows. Findings from this pilot implementation suggest that PHC can be integrated into clinic workflow systems, but clinicians and researchers need to better understand the role of implementation outcomes to leverage the benefits of tailored web-based interventions for people living with HIV.

Keywords: Internet; patient care, attitudes, vulnerable populations, public health practice

Introduction

Interventions are being developed for clinical settings to retain and support patients in human immunodeficiency virus (HIV) care [1,2]. However, the clinical context presents barriers to implementing new HIV retention and adherence interventions [3-7]. These barriers need to be addressed before widespread adoption of clinic-based interventions can occur [8].

Computer-based HIV adherence interventions appear to be feasible and acceptable from the patient perspective [9], but they have not been studied from the perspective of the clinic stakeholder implementing such interventions. The benefit of understanding
implementation is that strategies can be designed to facilitate integration of evidenced-based interventions into care. Positive Health Check (PHC) is a web-based video counseling tool to reduce HIV transmission and improve health outcomes for people living with HIV (PLWH). The tool was developed based on evidence that computer-based counseling tools can reduce sexual risk behaviors and improve antiretroviral therapy (ART) adherence [1,2,10-13] and viral load suppression [12]. PHC is grounded in the Information-Behavior-Motivation model [14], Motivational Interviewing [15], and the Transtheoretical model [16]. The approach assumes that providing information and building motivation for medication adherence, appointment keeping, and other behaviors will result in PLWH correctly practicing skills needed to manage HIV.

The purpose of this pilot was to determine patients’ consent and completion rates when using PHC and to examine implementation outcomes including (1) appropriateness (i.e., the perceived fit, relevance, or compatibility of PHC and/or perceived fit of PHC to address a particular issue or problem), (2) acceptability (i.e., the perception among implementation stakeholders that PHC is agreeable, palatable, or satisfactory), and (3) feasibility (i.e., the extent to which PHC can be successfully used or carried out within a given agency or setting) [17,18]. As such, it helps fill a need in the literature to better understand implementation of these interventions in complex clinic settings [19].

Methods

Positive Health Check Intervention and Procedures
We conducted a 1-month pilot implementation of PHC in four HIV primary care clinics (Clinics A, B, C, and D). An overview of PHC is shown in Figure 1. PHC is introduced to patients by a designated clinic staffer, referred to as an “onboarder,” who offers an eligible patient in the waiting room the opportunity to use the intervention. The onboarder accesses the PHC Clinic Web Application (CWA) to generate a user ID and password. Based on responses to questions about clinic attendance, medication usage, and HIV risk behaviors, each patient watches individually tailored videos addressing HIV treatment readiness, ART adherence, retention in HIV medical care, sexual risk reduction, prevention of mother-to-child transmission, and safer injection drug use practices. Patients can select questions to ask their clinic doctor during their scheduled appointment, and they are provided behavioral strategies, called “tips,” to practice. A patient handout featuring this information is automatically printed and delivered to the patient, and a truncated version is delivered to the provider at the request of the patient. At the end of the intervention, patients also can view supporting resource materials. The onboarder uses the CWA to track process data, including the number of patients who logged on, completed the intervention, or requested that a link to PHC be sent to their private email. PHC does not collect any personal identifying information or patient data, and no email addresses are stored.

Figure 1. Flow diagram for Positive Health Check, an intervention for people living with HIV, piloted in the Southeastern United States: 2015
Study Design
This implementation pilot study was conducted from May to July 2015, and each of the four participating clinics implemented PHC for 1 month during that period. A multiple case-study design [20] was used to gather process evaluation data to examine and describe the contextual and implementation issues that might help other clinics adopting PHC prepare for implementation [21]. We also analyzed deidentified tool usage data to understand patients’ navigation, use, and completion of the tool.

Clinic Eligibility
Four HIV clinics were located across rural, urban, and suburban areas. All clinics were required to (1) provide primary HIV care to at least 200 HIV-positive patients annually; (2) use the CWA on a secure, networked Windows desktop, workstation, or server; and (3) have broadband Internet access that supports wireless Internet access for iPad and Android devices. The characteristics of the four participating clinics are summarized in Table 1.

Table 1. Characteristics of HIV primary care clinics in the Positive Health Check pilot, an intervention for PLWH piloted in the Southeastern United States: 2015

<table>
<thead>
<tr>
<th>Clinic Demographics</th>
<th>Clinic A</th>
<th>Clinic B</th>
<th>Clinic C</th>
<th>Clinic D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Service Area</td>
<td>Rural</td>
<td>Urban</td>
<td>Suburban</td>
<td>Urban/Suburban</td>
</tr>
<tr>
<td>Type of Clinic</td>
<td>Nonprofit</td>
<td>Ambulatory</td>
<td>Ambulatory</td>
<td>Ambulatory</td>
</tr>
<tr>
<td>Clinic</td>
<td>Multi-Specialty Practice</td>
<td>Public Hospital</td>
<td>Primary Care Practice</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------</td>
<td>-----------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>Nurse-Managed Clinic</td>
<td></td>
<td>Academic Medical Center</td>
<td>Specialty Care Practice</td>
<td></td>
</tr>
<tr>
<td>Total Patient Visits per Year (N)</td>
<td>1,000</td>
<td>800</td>
<td>4,617</td>
<td>7,400</td>
</tr>
<tr>
<td>Average Patient Visits per Day (N)</td>
<td>10</td>
<td>15 to 20</td>
<td>50</td>
<td>8</td>
</tr>
</tbody>
</table>

**Patient Demographics**

| Total HIV-Positive Patients (N) | 257 | 140 | 1,927 | 1,110 |

<table>
<thead>
<tr>
<th>Sex (%)</th>
<th>(100%)</th>
<th>(100%)</th>
<th>(90%)</th>
<th>(100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>60%</td>
<td>60%</td>
<td>71%</td>
<td>71%</td>
</tr>
<tr>
<td>Female</td>
<td>40%</td>
<td>40%</td>
<td>29%</td>
<td>29%</td>
</tr>
<tr>
<td>Transgender</td>
<td>0.1%</td>
<td>Unknown</td>
<td>0.1%</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race (%)</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>13%</td>
<td>39%</td>
<td>32%</td>
<td>26%</td>
</tr>
<tr>
<td>Black or African American</td>
<td>87%</td>
<td>60%</td>
<td>59%</td>
<td>70.67%</td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Asian</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
<th>(PLWH Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>2%</td>
<td>15%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>98%</td>
<td>85%</td>
<td>92%</td>
<td>90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (%)</th>
<th>&lt;18 = 0%&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;13</td>
<td>0%</td>
</tr>
<tr>
<td>13–24</td>
<td>4%</td>
</tr>
<tr>
<td>25–44</td>
<td>31%</td>
</tr>
<tr>
<td>45–64</td>
<td>59%</td>
</tr>
<tr>
<td>&gt;65</td>
<td>6%</td>
</tr>
</tbody>
</table>

HIV, human immunodeficiency virus; PLWH, people living with HIV. Percentages may not add to 100% because of rounding.

<sup>a</sup> Age ranges for Clinic D were reported in different ranges than other clinics.

**Patient Eligibility**

For this pilot, HIV-positive, English-speaking patients who were at least 18 years old were eligible to use the intervention. Onboarders invited patients to use PHC after checking in to see their provider. One clinic contacted patients by telephone before appointments and issued invitations.
Preparing Clinics for Implementation

We provided each clinic with three tablets equipped with high-impact protective cases, privacy screens, and headphones for individual patient use. Additionally, we trained clinic staff how to use PHC and the CWA to onboard patients and generate summary reports. Staff also received user guides covering all aspects of intervention implementation.

Data Collection

In addition to collecting data from the CWA to understand patients’ use of the intervention, we collected feedback from key informants (N=9), including the intervention onboarder and one primary care provider, at each clinic during weekly calls. At one site, an additional HIV primary care provider participated.

Pairs of interviewers conducted a series of semi-structured interviews with each key informant. Each informant participated in 6 interviews: 1 face-to-face pre-implementation interview, 4 weekly telephone interviews, and 1 telephone wrap-up interview, for a total of 54 interviews across all 4 clinics. We asked participants a series of questions related to the implementation of PHC, including barriers and facilitators; contextual factors; and acceptability, appropriateness, and feasibility of the intervention. For example, we asked, “What types of patients do you think will most benefit from the intervention?” (appropriateness); “As a provider, what do you like the most/least about Positive Health Check?” (acceptability); “Describe to me how the tool is typically incorporated into your workflow, from the beginning to the end of a patient’s appointment” (appropriateness); “What aspects of your clinic environment do you think were an issue for how PHC was implemented? Why?” (feasibility); and “How, if at all, has implementing Positive Health Check affected the workflow of the doctors at your clinic?” (acceptability/feasibility). The pilot was deemed nonresearch and therefore did not require Institutional Review Board review.

Analysis

Interview notes were entered into NVivo 10.0. The notes were tagged by clinic, key informant type, and implementation phase (pre-implementation, weeks 1–4, and post-implementation). Notes were checked against audio recordings as needed for clarification and to ensure the accuracy of direct quotes used in reporting. For each interview, we operationalized and coded appropriate concepts using a framework analysis method [22]. As follows, we provide quotes from interview participants to illustrate the resulting themes. We also summarize descriptive statistics about tool usage generated from the CWA (Table 2).

Table 2. Usage Information Generated from the Clinic Web Application for PHC, an Intervention for PLWH Piloted in the Southeastern United States, 2015

<table>
<thead>
<tr>
<th>Total Approacheda</th>
<th>Clinic A n=17</th>
<th>Clinic B n=16</th>
<th>Clinic C n=91</th>
<th>Clinic D n=21</th>
<th>Total N=145</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declinedb</td>
<td>1 (5.9%)</td>
<td>1 (6.3%)</td>
<td>34 (37.4%)</td>
<td>5 (23.8%)</td>
<td>41 (28.8%)</td>
</tr>
<tr>
<td>Onboardedc</td>
<td>16 (94.1%)</td>
<td>15 (93.8%)</td>
<td>57 (62.6%)</td>
<td>16 (76.2%)</td>
<td>104</td>
</tr>
</tbody>
</table>
Results

Patients’ Consent and Completion Rates
A total of 145 patients were approached to use PHC across the 4 clinics, and 104 (71.7%) patients agreed to participate (Table 2). Although 68 (65%) of those 104 patients completed PHC, 29 (27.9%) did not complete the intervention, with Clinics C and D having particularly low patient completion rates of 39% and 31%, respectively.
Acceptability and Appropriateness

We asked key informants to what extent clinicians perceived that PHC was acceptable and appropriate, and what factors shaped these perceptions. Overall, clinicians reported that the intervention was acceptable and expressed support for its use and enthusiasm about its potential to support patients and providers.

This tool gave me an opportunity to understand that I probably need to do a better job of communicating with patients. In retrospect, the tool is good for the provider and if they look at what their patient’s concerns are and think it may change or may enhance the conversation they have with the patient. (Provider, Clinic D)

Typically patients are so overwhelmed with their diagnosis that the tool could really help them break things down and see the information in a different way. (Provider, Clinic C)

At each of the four sites, clinicians and administrators reported PHC was an appropriate and acceptable intervention for helping PLWH. In particular, the clinics liked the interactive components, such as patient selection of the doctor and the presentation of information in audio and video formats; the tailored messages based on patients’ responses; information being presented in a clear and concise manner, although there were some concerns about length at two of the clinics; the patient and provider handouts; and the ease of navigation, with the exception of password generation. One Clinic A provider reported, “What I really liked the most about the tool was the fact the patient could select who they wanted to hear…If they wanted to have a female provider, if they wanted to have a provider of color, if they wanted to have a male versus a female….”

All of the clinics indicated that providers also would benefit from PHC, because it supports interactions during the clinic visit, as facilitated largely by the tailored handouts. For example, several providers said that the handouts empower patients to ask questions and identify information gaps that needed to be addressed. The handouts also gave providers a starting point for discussions with patients. In one case, the handouts led a patient to reveal an undisclosed sexually transmitted infection. A provider in Clinic A said, “I did use the handouts to see what their concerns were or what they wanted to know more about, and that changed my conversation.”

Providers at two clinics expanded their notions of who would benefit from the intervention over the course of the implementation period. One saw the potential benefits expand by adapting the intervention for loved ones and by conducting group sessions. Initially, developers perceived PHC as a way to support the patient when interacting with their provider. Yet, over the course of implementation, providers in three clinics increasingly viewed PHC as helping them understand patients’ concerns. One provider in Clinic A learned she had been inadequately addressing medication adherence with her patients. Before implementation, this provider stated, “It is a great tool for patients, and also helps providers who don’t necessarily take the time to have conversations with patients that they should have. This may be the way for patients to get the information to start the conversation.” After implementation concluded, this provider was asked whether her
impression had changed. She said, “I still think the tool is great for patients to initiate a conversation. I still think this is a good way for patients to open up. Now, I think it’s actually an opportunity for providers to be a little more interactive and to dig a little deeper in conversations with the patient.”

Relatively low computer literacy diminished the extent to which PHC was deemed to be appropriate for the population served by one rural clinic. Because of provider concerns about patient literacy, in general, and computer literacy specifically, during the first 2 weeks of implementation in this clinic, PHC was offered only to patients who were able to use the intervention without assistance. PHC was then offered to all patients during the last 2 weeks of implementation. At this point, it became clear that patients with lower computer literacy required more assistance, primarily due to the complexity of password generation, which required more of the onboader’s time:

This [the tool] was very easy to use, but in rural areas like these many patients have no experience with the computer, at all. Many homes here don’t have Internet access….I think for people who don’t have any experience with computers, that they may not have really understood how the tool can be used…. (Provider, Clinic A)

### Feasibility

We also asked clinicians whether it was feasible to implement PHC as intended, and what factors affected feasibility. Their responses revealed two main themes: clinic workflow and physical environment.

#### Clinic Workflow

Several factors related to clinic workflow presented implementation barriers. Respondents reported the challenge of scheduling patients to complete PHC without compromising tightly managed clinic workflows. Onboarders at Clinics A and B mentioned that PHC added 15 to 20 minutes to the time that patients spent in the clinic before seeing the provider, which caused delays. Additionally, onboarded patients were often interrupted to attend their provider appointments. Clinics C and D reported that clinic workflow processes interrupted patients engaging with the intervention. At Clinic C, patients were often called back to their appointment before the onboader could deliver the handouts to the patient or provider. The onboader from Clinic B described the experience fitting PHC into clinic workflow: “Possibly to try to get them [the patients] when they first come in the building as opposed to waiting for them to come into...the waiting room so they can view it [the tool] out there.”

Three of the clinics onboarded patients into the intervention before their appointments. Two of these clinics had patients complete the intervention in exam rooms, and the third clinic had patients complete it in the waiting room, with the option of finishing in the exam room. Conversely, the fourth clinic onboarded patients after their appointments, in a room designated specifically for intervention use, which key informants said was arranged because of possible workflow disruptions if delivered before the visit.
Sometimes patients can do the tool before they go back, but that’s if they are pretty early, not if they are right on time or late. (Onboarder, Clinic A)

It would be much better if the clinic could have gotten the patient to use the tool before the visit...But the patients would need to come in early for their appointments. (Onboarder, Clinic C)

**Physical Environment**

The clinics’ physical environments also posed barriers that affected implementation feasibility. Two clinics were challenged by finding private space for patients to complete the intervention. At one clinic where patients were completing the tool in exam rooms, there were not enough rooms on particularly busy days. An onboarder at Clinic C said, “There were some cases during implementation where there was no space to complete the tool. If there was anything that hindered use of the tool, it would be the fact that it was very busy and there was overflow of patients.” Another challenge for three clinics was inconvenient locations for picking up handouts from the clinics’ fax printers. However, the location of the fax machine at three clinics, coupled with printing delays, led to handouts not being delivered consistently to patients or providers. To address some of these issues during implementation, we substituted the fax machines with wireless printers.

Handout delivery methods and success rates differed across clinics. Three clinics delivered handouts to patients in exam rooms, and this approach worked relatively well for two of these clinics, delivering 91% and 63% of handouts; however, it posed challenges for the third, delivering only 50% of handouts. In the fourth clinic, the printer was in the same room where patients completed the tool; consequently, they typically would retrieve their own handouts when generated. These findings suggest that handout delivery is feasible, but delivery methods call for refinement. As an onboarder from Clinic A said, “They would finish it [PHC] right before the provider came in, and once the provider is in there, I can’t give either patient or provider the handouts.”

**DISCUSSION**

**Principal Results**

This pilot study demonstrates that the web-based video tool PHC is an acceptable and appropriate intervention approach for HIV primary clinics to help support PLWH. This finding is supported by themes that emerged from the data indicating that clinic providers viewed the intervention as engaging and appropriate for patients, and that it presented information in new ways that could assist patients in their communication with providers or help them manage HIV. Aspects of the intervention design that resonated with the clinic staff included the video doctors’ tailored information presented in an interactive format. These are important intervention features, because electronic, tailored, and interactive interventions have been shown to be effective as they provide more appropriate information to patients, compared with interventions that are not tailored [23].

Overall, implementing PHC in four HIV clinics was feasible; 65.4% (n=68) of onboarded patients (n=104) completed the tool. However, we took responsibility for some of the unanticipated barriers that slowed implementation efforts. The first was requiring patients
to create overly complex passwords that took too much time and effort. The second barrier was finding the correct technology to print patients’ handouts; consequently, we provided wireless printers instead of fax printers. This study underscores the importance of using pilot test implementation outcomes and feedback from clinical stakeholders to inform implementation strategies.

**Limitations**
Several limitations pertain to this implementation pilot. First, we were able to include only the viewpoints of select key clinic staff at each site. Future assessments that rely on clinic staff should include a larger number over a longer period to better understand their viewpoints on implementation. Second, patients were engaged in piloting the intervention; however, we did not obtain user feedback on experience and satisfaction, which would be critical to inform future efforts to implement web-based interventions. Finally, although the four participating clinics varied in their type of service area and population base, PHC acceptability, appropriateness, and feasibility in other large urban clinics or those with extremely low resources require further study.

Despite these limitations, this pilot shows promise for the implementation of web-based interventions like PHC. This work contributes to our understanding of clinic environments and strategies that support intervention implementation. Clinical settings are governed by complex workflow procedures and the need to follow regulatory guidelines and professional association best practices [24,25]. To facilitate the implementation of web-based interventions that improve patient outcomes in clinical settings, clinicians need to address organizational workflow issues [26-30] and determine how these interventions can become a best practice. To close the gap in the HIV continuum of care for vulnerable populations, it is vital to understand and systematically study the implementation of web-based interventions in clinical settings.

**Acknowledgements**
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**Conflicts of Interest**
None declared

**Abbreviations**
ART: antiretroviral therapy
CWA: PHC Clinic Web Application
HIV: human immunodeficiency virus
PHC: Positive Health Check
PLWH: people living with HIV
References


