Published in final edited form as:

J Acquir Immune Defic Syndr. 2013 June ; 63(0 1): S66–S71. doi:10.1097/QAI.0b013e318292014f.

Adoption and Implementation of a Computer-delivered HIV/STD Risk-Reduction Intervention for African American Adolescent Females Seeking Services at County Health Departments: Implementation Optimization is Urgently Needed

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Abstract

Although group-delivered HIV/STD risk-reduction interventions for African American adolescent females have proven efficacious, they require significant financial and staffing resources to implement and may not be feasible in personnel- and resource-constrained public health clinics. We conducted a study assessing adoption and implementation of an evidence-based HIV/STD risk-reduction intervention that was translated from a group-delivered modality to a computer-delivered modality to facilitate use in county public health departments. Usage of the computer-delivered intervention was low across eight participating public health clinics. Further investigation is needed to optimize implementation by identifying, understanding and surmounting barriers that hamper timely and efficient implementation of technology-delivered HIV/STD risk-reduction interventions in county public health clinics.

Keywords

adolescent females; African Americans; intervention implementation

Introduction

Among adolescents, particularly African American adolescent females, a marked and persistent health disparity is the disproportionate impact of sexually transmitted diseases (STDs), including human immunodeficiency virus (HIV) infection.^{1–4} To confront this “national health crisis”^{5,6} the United States National HIV/AIDS Strategy emphasizes development and dissemination of effective HIV/STD risk-reduction programs, particularly for those populations most adversely impacted.⁷ Recent reviews indicate that behavioral HIV/STD interventions are effective in enhancing short-term adoption of preventive sexual behaviors among adolescents, including African American females.^{8–17} However, curtailing the HIV/STD epidemic among adolescents will depend on how quickly and efficiently we

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Conflicts of Interest: None reported.

can translate research into practice and scale-up prevention efforts into sustainable programs.

Unfortunately, there is a marked gap between new research knowledge and innovations (intervention development) and their translation into practice. The Institute of Medicine, in assessing the gap between knowledge creation and its translation to practice, noted that new knowledge generated through rigorous randomized controlled trials takes about 17 years to be translated into practice.^{18,19} Compounding this problem in translation, adopted new knowledge is often applied unevenly and ineffectually. Thus, the temporal chasm between research and prevention practice means we have invested substantial fiscal resources in developing evidence-based programs that are underutilized or not utilized. Furthermore, it also means we are failing to harness the best existing science to reduce HIV/STD risk.

To maximize the potential of HIV/STD prevention research to achieve population-level reductions in risk behaviors and disease requires development of a competent and fully operational infrastructure to promote the efficient dissemination of evidence-based HIV/STD risk-reduction interventions. To facilitate the translation of HIV/STD risk-reduction interventions from research to practice the CDC has developed a systematic and coordinated strategy to nationally disseminate effective behavioral HIV/STD interventions, including several for African American adolescents. This strategy also provides training in program implementation to community-based agencies and local health departments working in severely impacted African American communities.²⁰ Several barriers, however, impede the efficient dissemination of evidence-based HIV/STD interventions.

A key barrier impeding the efficient dissemination of evidence-based HIV/STD interventions is the format for implementation of these programs. Many of these evidence-based HIV/STD risk-reduction interventions are group-delivered. While efficacious, group-delivered interventions often require significant fiscal and personnel resources to train staff and implement the intervention; thus, they may not be feasible in resource-constrained public health clinics. To reduce the cost and related personnel constraints, newer implementation modalities may permit accessing a larger proportion of the at-risk population in underfunded county health departments and community-based organizations. One innovative, less costly, and easier implementation modality is to translate and disseminate evidence-based HIV/STD risk-reduction interventions for administration via laptop computer.

In this manuscript we describe a pilot study of the adoption and implementation of an evidence-based HIV/STD risk-reduction intervention for African American adolescent females that was translated from a group-delivered modality to a laptop computer-delivered modality for use in county public health departments. We also provide potential strategies to improve implementation of evidence-based HIV/STD risk-reduction interventions in county public health departments.

Methods

Description of the Innovation: Digital AFIYA HIV/STD Intervention (DAI)

The Digital AFIYA intervention (DAI) is a computerized program designed to promote the adoption and maintenance of HIV/STD risk-reduction behaviors among African American adolescent females. The program was translated from a group-formatted intervention to one delivered via a PC laptop computer to facilitate adoption and implementation by county health departments. The program contains auditory and visual components and user-friendly navigation tools to enhance self-administration. The program is self-paced, permitting users to replay earlier sections to clarify, reinforce, and enhance their understanding of program

content. Digital AFIYA was originally designed as a single 45 minute program, but subsequent to health department feedback, was modified to be administered using a modular format consisting of three 15-minute modules. This design change enhances flexibility of use, allowing users to complete the DAI in stand-alone modules and return to a subsequent module to review previously accessed content.

The computerized program is based on a brief version of a CDC-defined evidence-based HIV/STD intervention known as HORIZONS.²³ HORIZONS is a culturally- and gender-congruent group-delivered risk-reduction intervention implemented in clinical venues, including a county health department, and was evaluated in a randomized controlled trial. Findings demonstrated that HORIZONS was efficacious in increasing, hypothesized psychosocial mediators of safer sex, condom use and, most importantly, decreasing incidence of STDs among African American young women over a 12 month follow-up period. Similar to the original HORIZONS intervention, Digital AFIYA promotes adoption of HIV/STD-preventive behaviors by identifying and intervening on participants' personal, social, and environmental barriers to practicing safer sex. There are five core elements in HORIZONS that are also articulated in Digital AFIYA: (1) enhancing ethnic and gender pride and identifying role models, (2) improving sexual health decision-making, (3) increasing HIV/STD knowledge, (4) differentiating between healthy and unhealthy relationships, and (5) enhancing safer sex negotiation skills.

Design for Enhancing Adoption and Implementation of the Digital AFIYA

Intervention—Interventions, including HIV risk-reduction programs with demonstrated evidence of efficacy derived from randomized controlled trials, often require additional work before they can be implemented in community or clinical venues.^{21, 22} Thus, to facilitate implementation of the computerized risk-reduction intervention we employed a study design with four sequential phases: (1) recruiting county health department clinics, (2) conducting pre-service interviews with clinic staff and administrators prior to delivering the computerized risk-reduction intervention, (3) providing training and technical assistance (TA) and delivery of the computerized HIV/STD risk-reduction intervention (Digital AFIYA Intervention - DAI) for 3 months, and 4) post-delivery interviews and survey with clinic staff and administrators following the 3 month implementation period. Figure 1 depicts the feasibility study design. (figure 1)

Institutional Adoption of the Innovation (Digital AFIYA Intervention)—During the adoption phase the study team began identifying Georgia counties with a county health department in which African American adolescent females were a key constituent population. Over a 6 month period, the study team identified 15 health departments. At each of the 15 health departments, key stakeholders, specifically the District Health Director and 4 clinical staff, were informed about Digital AFIYA and their willingness to participate in a study that was designed to enhance adoption and implementation of Digital AFIYA was assessed. Of the 15 health departments approached, 8 agreed to participate in the study, yielding an institutional adoption rate of 53%.

Identifying Barriers to Adoption

Barriers to adoption are wide ranging and can include financing for new risk-reduction programs, attitudes towards the proposed innovation (Digital AFIYA), loyalty to existing non-evidence based and evidence-based interventions, assessment of economic benefits and organizational factors such as institutional readiness for change. The study staff conducted elicitation interviews with the Directors of the eight county health departments that agreed to participate in the study (n=8) and elicitation interviews with four clinical staff from each participating clinic for a total of 32 staff interviews. The elicitation interviews revealed the

following potential barriers to program adoption: (1) having limited financing available for implementing new HIV/STD risk-reduction programs, (2) being concerned that implementation of the DAI would interrupt normal clinical flow, (3) having limited procedural knowledge about how to use the DAI, (4) having limited knowledge or understanding of the principles and theory behind the DAI, (5) having limited support for maintaining continuous use of the DAI, and (6) being concerned about program length (45 minutes) for participants to initiate and complete the DAI.

Addressing Barriers to Adoption of the Digital AFIYA Intervention—As a result of these findings the study team sought to enhance the infrastructure of the health departments to facilitate adoption of DAI. Specifically, the study team: (1) provided the DAI “free of charge” to the county health departments, (2) offered an in-service training, also free of charge, to enhance procedural knowledge about how to use the DAI and to enhance understanding of the principles and theory underlying the DAI, (3) offered technical assistance to enhance support for continuous maintenance of the DAI, (4) added a DAI Welcome Screen on the laptop that appeared immediately when the computer was powered on, and (5) redesigned the single 45 minute DAI format to a modular format that consisted of three 15-minute modules that allowed users to complete the DAI in stand-alone modules and return to a subsequent module at another time in their visit or during a subsequent clinic visit.

Strategies Employed to Enhance Implementation of the Digital AFIYA Intervention—Implementation research investigates how specific activities and strategies are related to the quality and fidelity of evidence-based intervention (EBI) implementation within specific service systems and settings. Implementation studies examine factors that influence implementation quality (e.g. organizational leadership attitudes, staff training and technical assistance resources, organizational tolerance for change, participant preferences and organizational climate); the process of incorporating EBIs into existing systems; the extent to which intervention delivery is faithful to the original design; and how EBIs are monitored to determine impact on proximal as well as ultimate target behaviors. Two critical implementation strategies that influence implementation quality are training and technical assistance.

Training to Enhance Implementation of the Digital AFIYA Intervention—Each county public health department received two laptop computers with the preloaded DAI. Immediately prior to delivering the laptops, members of the research team visited each clinic to provide on-site training on program implementation. All staff members and administrators were invited to participate in the training. Key clinic personnel involved in daily clinic operations were primary attendees. Trainings were typically held during lunch or before or after a staff meeting. The 3-hour training was administered by an Emory Master Trainer who was involved in developing the DAI. The training consisted of: (1) clinic staff viewing all modules of the DAI, (2) an explanation of how to use the DAI that involved role plays and didactic instruction, (3) a presentation of the theory, core elements, and key characteristics of the DAI, role modeling vignettes that were portrayed on the DAI, and a question-and-answer period regarding intervention content, led by a health educator from the research team; and (4) a discussion of the target population for the DAI (i.e. African American adolescent females, ages 14–20 years).

Upon completion of the training, members of the research team set-up the laptop computers in an area designated by the clinic that was easily accessible to the clinic’s adolescent clients. Headphones and locking devices to secure the laptops were provided for each laptop. After set-up was complete, the staff person(s) primarily responsible for administering the

intervention were given the opportunity to ensure the laptop was fully functional and ask questions.

Provision of Technical Assistance to Facilitate the Digital AFIYA Intervention Implementation—Technical assistance (TA) typically follows training sessions and is necessary for providers of HIV/STD risk-reduction interventions delivered within institutions and community organizations. Although data on the effectiveness of various TA models is largely lacking, available research suggests that TA should be proactive, nonpunitive, individualized and frequent. Thus, over a 3-month period Master Trainers were available to provide technical assistance. A Master Trainer was available to respond to technical difficulties experienced when administering the DAI. Each laptop was equipped with a small note card attachment that outlining troubleshooting tips and technical support telephone numbers.

Evaluating Implementation of the Digital AFIYA HIV/STD Intervention—The DAI pilot occurred in eight Georgia health department clinics located in seven non-urban counties offering sexual health services for adolescents. Clinics received two laptop computers on which to administer the intervention. An online service automatically captured DAI usage over a 3-month implementation period, safely transmitting DAI uptake data to a secure server on a daily basis. Thus, each time a client was logged onto the computer; the computer captured the log-on, number of intervention modules completed, and time-on-computer. The 3-month implementation period was initiated following completion of a one-week pilot period allowing time for clinic staff to become acclimated with the intervention and determine how to best integrate the intervention into clinic practice. Measuring DAI implementation began following completion of the one-week pilot period.

Follow-Up Implementation Assessments

Following the 3-month implementation period, the study team administered implementation assessments to clinic staff (n=38) and administrators to assess newly identified implementation barriers. Additionally, research staff conducted one-on-one exit interviews (n=17) with clinic staff primarily responsible for DAI implementation to gain insight about the feasibility of integrating the computerized intervention into clinic practice.

Implementation Results

Number of Clients' Reached with DAI

At the end of the 3-month implementation period, we cumulated the number of users exposed to the Digital AFIYA intervention across all participating clinics. Over the 3-month implementation period there were eleven total users of the DAI; eight of whom completed the entire 3-module (45 minute) intervention. Over half of the usage (n=6) was from a single county health department. Four county health departments had no usage during the 3-month implementation period.

Staff Perceptions of Implementing the DAI

The ACASI survey conducted with clinic staff at the end of the 3-month implementation period showed clinic staff believed the DAI was equally or more innovative (72%) and equally or more engaging (54%) than existing HIV/STD risk-reduction programs offered in their clinic. Additionally, a majority of clinic staff (80%) reported having the resources necessary to implement the DAI; and 65% reported only minor changes to current clinic practice were required for integration of the DAI into their typical programmatic activities. Further, in exit interviews with clinic staff and administrators primarily responsible for the DAI implementation, 35% specified that the intervention provided more detail about risk-

reduction strategies (i.e. demonstration of proper condom use and interpersonal communication) than what was typically provided in routine clinic visits. Additionally, a majority (76%) indicated clinic clients also had a positive perception of the DAI.

Implementation Barriers

While the clinic staff was, overall, complimentary of the DAI, we observed low frequency of DAI administration to clients. Additional elicitation interviews conducted at the conclusion of the 3-month implementation period noted that, despite positive views of the DAI, staff members and administrators identified key barriers to adoption of the DAI within their public health clinic. Below we outline qualitative findings that describe key barriers to implementation of the DAI.

Time—Time-related issues presented the greatest challenge. Clinic staff believed low usage was primarily attributable to time constraints for both the clinic staff (47%) and clients (82%). Staff from half of the participating clinics reported being understaffed or having competing priorities as a primary barrier impeding DAI implementation. Requirements to complete state-mandated tasks during a routine clinic visit left little time for clients to view the DAI. Consequently, staff found it difficult to integrate the intervention into the time allotted for client visits without disrupting the clinic's routine. As one staff member noted,

“Like I said people will do it if it doesn't interrupt the regular routine and flow of things. But if people find that it does interrupt, they won't do it as much.”

The importance of “not making the nurse wait” was a common theme, preventing some clinics from administering the DAI while clients were seated in the waiting area prior to the start of their medical assessment. Moreover, efforts to have clients view the DAI upon completion of their visit at three clinics were unsuccessful. Staff described their clients as always “in a hurry” or “want[ing] to get in and out.” Some clinic staff (35%) specifically referred to teens being hurried to complete their visit because they were dependent upon transportation from others or had limited time to remain at the clinic to view the DAI because of jobs, school or extracurricular activities. Emphasizing this point, one staff member stated,

“Again, the time. We have a lot of kids that come over right after school. And they're trying to get in and get out, because they have other stuff. They have part-time jobs, they have band, they have whatever that they have to get to.”

Low client volume—Clinics also reported low numbers of clients from the target population during the 3-month implementation period. Two county health departments previously providing services to African American adolescent females experienced significant decreases in client throughput attributable to restructuring of public assistance programs.

Additional barriers—Successful adoption of the DAI also may have been adversely impacted by the manner in which clinic staff introduced the DAI to clients. In some cases, staff members described the DAI as a “test” or a “survey.” This likely had a negative impact on clients' willingness to participate. Further, some clinic staff failed to explain to clients that the DAI could be administered in three sequential, discrete, 15-minute modules; rather, they described the DAI as a single “45-minute task.” Additionally, personal biases of clinic staff in two counties may have influenced to whom the intervention was offered. As an illustration, although clinics were not instructed to specifically target sexually experienced adolescents, a nurse from one county health department did not offer the DAI to all African American adolescent females seeking clinic services, but only to teen mothers. When asked why she did not offer the DAI to all African American adolescent females in the target range

range, she responded that “[she] only felt comfortable showing the intervention to those she could confirm were sexually experienced.” Biases were not frequently reported, but may have had an undetermined and significant adverse impact on intervention implementation in these counties.

Conclusions

The observed utilization of the Digital AFIYA Intervention by African American adolescent female clients at public health clinics reflects challenges in disseminating HIV/STD risk-reduction interventions for adoption and implementation in busy county public health clinics. The findings from the current study highlight the sometimes unique and often challenging nature of HIV/STD risk-reduction dissemination research. Even when clinics have self-selected to participate in an HIV/STD risk-reduction implementation study, are provided two laptop computers on which to administer the computer-deliver intervention, as well as in-service training and ongoing technical assistance, intervention implementation was poor.

There are a number of potential factors that could have positively impacted DAI implementation in county health department clinics. First, clinics may have benefitted from more guidance on how to promote the DAI in ways that enhanced clients’ interest. For example, the research team could have provided signage and promotional materials to be distributed to clients to encourage their use of the DAI. During the implementation period, additional engagement between research staff and clinic staff could have resulted in improved DAI implementation by clinic staff. Additionally, DAI implementation may have been improved by providing centralized training for health departments in close proximity to one another, rather than conducting in-service training separately in each of the public health clinics. Such centralized training may foster greater collective support for DAI implementation across similar public health clinics.²⁴ Furthermore, providing periodic, face-to-face meetings could have allowed staff to (1) observe on-site challenges, and (2) offer administrators an opportunity to share concerns or suggestions for improving implementation. Finally, despite positive perceptions of the DAI, qualitative interviews revealed competing priorities may have hindered effective implementation; consistent with previous studies identifying implementation barriers.²⁵ Clinic staff have state-mandated tasks that must be completed during client visits, leaving limited time for additional health promotion and disease risk-reduction education, despite its perceived value. Thus, implementation could be improved by garnering support from key personnel at the state level who are involved in developing mandates/policies to endorse or require the use of the DAI or similar health promotion interventions.²⁶

Given the marked racial disparity in STDs and HIV among African American adolescent females, there is a clear and compelling urgency to develop and disseminate risk-reduction interventions for this vulnerable population. However, there is an important caveat for implementation science. Even when interventions are translated into a less costly delivery modality, are less personnel-intensive, and offered with ongoing technical assistance, there is no assurance that this will result in the successful implementation of interventions. To overcome obstacles to effective intervention implementation may require a more thorough understanding of the complexity and diversity of barriers that may adversely affect optimal implementation. As indicated by both the quantitative and qualitative feedback in this study, additional strategies to incorporate HIV/STD interventions into the existing flow of clinical services are needed. Furthermore, enhancing public health clinic staff’s “buy-in” to such interventions is essential for the effective dissemination among all clinic attendees. Implementation of HIV/STD interventions could also be fostered by policies supporting their use or from additional support from clinic administrators.

To best meet the needs of African American adolescents further assessment of the acceptability and implementation of technology-delivered interventions is needed. Given the growing, ever-changing technology landscape used by adolescents, an in-depth investigation of the most effective platforms for HIV/STD intervention delivery may also improve overall usage. For example, use of mobile, social networking or online platforms may provide for more flexible intervention delivery that could be better incorporated into the busy lives of adolescents.^{27,28} Ultimately, dissemination of evidence-based HIV/STD interventions via technology modalities offers great promise to reach those most at-risk. However, realizing the promise and potential of new technology-delivered HIV/STD risk-reduction interventions will require further detailed study to optimize implementation.

Acknowledgments

Financial Support: This research was funded through the Office of Social and Behavioral Science Research and the National Institute of Mental Health (5R01 MH070537) to the first author. We also acknowledge support from the Emory Center for AIDS Research (P30 AI050409), the Atlanta Clinical & Translational Science Institute, and the Center for Contextual Genetics & Prevention (P03 DA027827). Jennifer L. Brown was supported by K12 GM000680 from the National Institute of General Medical Sciences. Jessica M. Sales was supported by K01 MH085506 from the National Institute of Mental Health.

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Figure 1.
Study Design