LinkPositively : A Trauma-Informed Peer Navigation and Social Networking WebApp to Improve HIV Care among Black Women Affected by Interpersonal Violence

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Journal of Health Care for the Poor and Underserved, Volume 32, Number 2, May 2021 Supplement, pp. 166-188 (Article)

Published by Johns Hopkins University Press

DOI: <https://doi.org/10.1353/hpu.2021.0056>

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***LinkPositively*: A Trauma-Informed Peer Navigation and Social Networking WebApp to Improve HIV Care among Black Women Affected by Interpersonal Violence**

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Abstract: In the U.S., Black women living with HIV/AIDS (WLHA) are affected disproportionately by interpersonal violence, which often co-occurs with adverse mental health and/or substance use, and exacerbates existing poor HIV care outcomes. Peer navigation has been successful in improving HIV care; however, HIV clinics often lack resources for sustainability and may not account for socio-structural barriers unique to Black WLHA. To address this gap, we developed *LinkPositively*, a culturally-tailored, trauma-informed WebApp for Black WLHA affected by interpersonal violence to improve HIV care outcomes. Using focus group data from nine Black WLHA and peer navigators, we developed *LinkPositively*. Core components include: virtual peer navigation to facilitate skill-building to cope with barriers and navigate care; social networking platform for peer support; educational and self-care tips; GPS-enabled resource locator for HIV care and support service agencies; and medication self-monitoring/reminder system. If efficacious, *LinkPositively* will shift the HIV prevention and care paradigm for Black WLHA.

Key words: Webapp, HIV care, peer navigation, social networking, Black women, interpersonal violence.

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Though there have been significant advances in HIV prevention and care in recent years, Black women continue to be disproportionately affected by HIV in the United States (U.S.).^{1,2} In 2018, Black women accounted for 58% of all new HIV infections in women, despite only constituting 13% of the U.S. female population.³ Black women are 15 times more likely to be diagnosed with HIV than White women.⁴ Black WLHA are less likely than Latinx and White WLHA to be linked to HIV care within 90 days of diagnosis (64% vs. 69% and 74%)⁵ and only 56% are retained in care.³ While WLHA overall are less likely to be virally suppressed than men, Black WLHA are less likely to be virally suppressed compared with White WLHA.^{6,7}

Concurrently, Black women are disproportionately affected by interpersonal violence, defined as physical, sexual, and/or psychological abuse by any type of perpetrator, regardless of gender, race/ethnicity, and/or type of relationship. Whereas the national prevalence of lifetime violence victimization by an intimate partner (i.e., [ex-]spouse, boyfriend, partner), also known as intimate partner violence (IPV), among U.S. adult women is 45%,⁸ Black women report 35% higher lifetime IPV victimization prevalence than White women.⁹ Moreover, although national data estimate the lifetime prevalence of rape among Black women at 21%,⁸ this is likely underestimated given studies utilizing community-based samples reporting prevalence rates of rape as high as 54%.^{10–12} Women living with HIV experience high rates of adulthood interpersonal violence (67%),¹³ lifetime IPV (55%),^{14,15} and past year IPV (27%).¹⁶ Interpersonal violence victimization among WLHA is associated with decreased antiretroviral therapy (ART) adherence^{13,14,17,18,19} and reduced viral suppression.^{15,18,20} Women with a history of violence victimization are eight times less likely to be virally suppressed than women without a history of violence victimization.²¹

Compounding HIV and interpersonal violence, WLHA face co-occurring syndemic conditions (substance use, mental health conditions) and socio-structural barriers to care (HIV stigma, medical mistrust, unmet housing and transportation needs), to greater extents than HIV-negative and male HIV-positive individuals,^{22–24} affecting retention in care and ART adherence.^{23,25–29} Black WLHA are also more likely to experience these syndemic conditions and socio-structural barriers than their White counterparts.^{30,31} HIV stigma is one of the most frequently noted barriers to retention in HIV care and ART adherence among Black WLHA.^{30,32,33} Similarly, medical mistrust has been found to predict lower ART adherence^{34–36} and experiences of racism and the quality of provider relationships have affected engagement in HIV care among Black Americans living with HIV.³⁴ In contrast, social support may mitigate the impact of socio-structural barriers on HIV care outcomes among Black WLHA. Higher perceived social support is associated with fewer depressive symptoms as well as ART adherence,^{37–39} fewer HIV-related health symptoms,⁴⁰ less HIV stigma,^{41,42} and greater perceived ability to engage in HIV care²⁹ and HIV self-management.⁴³

Peer navigation has been highlighted as a successful model of care in improving outcomes along the HIV care continuum.⁴⁴ Peer navigators (PNs) are individuals living with HIV, who are medication-adherent role models with shared lived experiences as their clients.⁴⁴ Peer navigators provide social support and positive modeling of engagement-supportive behaviors to their clients.⁴⁵ Peer navigators have been found to help build self-efficacy in patient-provider communication and decrease medical

mistrust, offsetting the negative impact of socio-structural barriers.⁴⁵ Studies show that increased linkage to and retention in care among WLHA, facilitated by a PN, is feasible, acceptable, and efficacious in the U.S. and other countries,^{46–48} and can improve ART adherence^{49,50} and viral suppression.^{51,52} Further, social support group participation with HIV-positive peers has demonstrated benefits for WLHA, related to mental health, relationships, and socio-structural barriers.^{53,54}

Utility of technology-based interventions. With increased Internet access and smartphone ownership, technology-based interventions have become an appealing and feasible option for improving health.⁵⁵ Particularly in the era of the COVID-19 pandemic, technology-based interventions are important channels to provide services to vulnerable populations while mitigating the risks of in-person services in the context of COVID-19.^{56,57} Further, with reduced or no in-person support, technology-based interventions and programs including telehealth may help buffer the effects of loneliness and social isolation.^{56,58} Finally, technology-based interventions are perceived to be more confidential, lead to more efficient and perceived safer care, and feel more empowering for women with a history of interpersonal violence.^{59–61}

In the realm of HIV care, technology-based interventions primarily employ mobile apps or are SMS-based (text message-based). Such interventions have been developed for WLHA outside the U.S.,^{62,63} older WLHA in the U.S.,⁶⁴ pregnant WLHA,^{65,66} people living with HIV (PLWH) regardless of gender,⁶⁷ transgender WLHA,^{68,69} and for HIV prevention;^{70,71} to our knowledge, none have been developed for cisgender WLHA, Black WLHA, or WLHA who have experienced interpersonal violence. The existing technology-based interventions have demonstrated effectiveness in decreasing viral load, improving engagement in care, and increasing ART adherence.^{72,73,74,75} As noted, technology-based interventions among WLHA in the U.S. are limited, though a majority of U.S. women (91%) use the Internet, including 87% of Black women.⁷⁴ Smartphone use is also very common among Black individuals overall (80%).⁷⁵ However, technology-based interventions have focused neither on the syndemic conditions nor the unique barriers faced by WLHA^{76,77} despite interest in, advantages, and acceptability of technology-based interventions, particularly for increasing social support.^{78,79}

Responding to this need, we developed the web-based application (or WebApp) entitled *LinkPositively*, a culturally relevant, gender-specific mHealth intervention tailored for Black WLHA who have experienced interpersonal violence, to improve HIV care outcomes through peer navigation, informal social support through social peer networking, resource location assistance, educational tips, and ART self-monitoring and reminders. The present paper aims to describe the conceptualization of the *LinkPositively* WebApp, the elicitation of feedback on the WebApp conceptualization from Black WLHA who have experienced interpersonal violence and PNs, and the responsive creation of the *LinkPositively* WebApp.

Methods

***LinkPositively* WebApp theoretical underpinnings.** The conceptualization of the *LinkPositively* WebApp relied on the *Theory of Triadic Influence*, a multilevel social cognitive theory that hypothesizes three “streams of influence” (individual, social, and structural)

act simultaneously to affect health behaviors.⁸⁰ Articulated to relevant dynamics of engaging Black WLHA affected by interpersonal violence with poor ART adherence, the relevant streams of influence *LinkPositively* aims to target are individual-level (i.e., ethnic minority, interpersonal violence) and social-structural level (e.g., HIV stigma, medical mistrust) barriers known to decrease engagement in HIV care. Simultaneously, *Syndemic Theory* is employed as a key framework for understanding co-occurring and synergistic epidemic conditions, which are exacerbated by the inequitable social, economic, environmental, and political milieu in which a population is immersed.⁸¹ In addition to being HIV-positive, WLHA experience interpersonal violence and co-occurring mental health conditions and substance abuse as key syndemic factors that contribute to poor engagement in HIV care and poor ART adherence among Black WLHA.

Principles of trauma-informed care (TIC) serve as the foundation of *LinkPositively*, embedded within the Theory of Triadic Influence and Syndemic Theory. Trauma-informed care is based on Trauma Theory, which asserts that if traumatic memories cannot be processed, then they are stored as physiological reactions to stimuli, situations, or states of arousal that recall the traumatic experience.⁸² Individuals with a history of traumatic life events, including interpersonal violence, may become distressed or re-traumatized by health care experiences.⁸³ Trauma-informed care aims to meet the unique needs of violence survivors⁸⁴ and has been applied in contexts of substance use, mental health and physical health care,⁸⁵ HIV prevention, and to a lesser extent, HIV treatment.⁸⁶

***LinkPositively* conceptualization.** The *LinkPositively* WebApp is conceptualized as a multi-component, culturally-tailored, and trauma-informed mHealth intervention designed to primarily increase retention in HIV care, ART adherence, and viral suppression for Black WLHA affected by interpersonal violence. Specifically, *LinkPositively* will provide Black WLHA with formal support through peer navigators, together with informal support through peer support networks, to foster a robust support network that offsets the negative effects of interpersonal violence on HIV outcomes.

The five components of *LinkPositively* include: (1) virtual peer navigation to facilitate skill-building to cope with histories of interpersonal violence, barriers, and navigate care; (2) social networking platform to enable peer support; (3) educational and self-care tips that are received daily and also searchable; (4) GPS-enabled resource locator, similar to Yelp, to find nearby HIV care and support service agencies; and (5) medication self-monitoring and reminder system. The five components of *LinkPositively* will achieve improvements in HIV care, ART adherence, and viral suppression, directly by improving self-efficacy for coping, accessing and building social support networks, and using ancillary support services (e.g., interpersonal violence, mental health, substance abuse services), and indirectly by reducing HIV stigma and medical mistrust (Figure 1). The WebApp format is accessible through, and responsive to (e.g., resizing depending on the device), any Internet browser on a smartphone, tablet, or computer. *LinkPositively* is developed as a mobile-responsive website instead of a native app (e.g., an Android or iOS app) for several reasons: (1) Black WLHA with any smartphone device may access the intervention as long as they have an Internet browser on their phone; (2) websites have less maintenance than native apps, improving the long-term

Figure 1. *LinkPositively* WebApp conceptual model.

sustainability of the intervention; and (3) websites are less costly to develop than native apps, while still being able to deploy our proposed interactive components, accessible 24 hours per day as long as there is Internet access.

It is important to note that among Black adults, smartphone devices play a more central role in providing Internet access, compared with laptops and desktop computers.⁷⁵ Black adults are more likely than Whites to rely on their smartphones for seeking health information. Additionally, smartphone ownership among Black adults (80%) approximates that of White and Hispanic adults (82% and 79%, respectively).⁷⁵ Although smartphones help bridge Internet access gaps, other data show that Blacks, Hispanics, and lower-income smartphone users are about twice as likely as Whites to have canceled or cut off service because of the expense.⁷⁵

LinkPositively WebApp components. *Virtual peer navigation.* Virtual peer navigation occurs over five weeks, inclusive of one intake session, comprising needs assessment, goal-setting, and linkage to services, and four educational sessions. Educational sessions focus on: a) increasing emotional awareness and understanding trauma and co-occurring syndemic conditions, b) cultivating emotional regulation and distress tolerance, c) activating social support networks, and d) addressing the impact of interpersonal violence on socio-structural barriers and strategies to overcome them. Participants will be matched with a trained and trauma-informed virtual PN, based on similar life experiences. All peer navigation sessions occur through video calls, a platform linked to using the WebApp. Participants will be able to text/call their virtual PN during and after the sessions. At the back end of the site, PNs will be able to enter case notes on the peer navigation sessions and check-ins, set notifications and appointment reminders, and send their assigned participants direct messages that will show up only on that participant's profile.

Social networking platform. Informal social networking occurs through a social networking platform or feed like that of Facebook. Participants are able to create a customizable profile (avatar image, name, *about me* section) and disclose information they wish to share about themselves. Within the feed, women have the opportunity to

share information, stories, and successes, as well as ask questions and advice from other women via posts. Women can interact with each other through comment and reaction (emoji) functions, and all feed activity is inaccessible by PNs, to ensure privacy and allow all women to engage with one another without the presence of PNs.

Educational and self-care tips. Brief educational, self-care, and healthy living tips are integrated into the social networking feed, as well as tips for best strategies for overcoming the effects of interpersonal violence, mental health conditions and substance use, and Black WLHA experiences with medical mistrust and HIV stigma. A new educational tip is featured at the top of the social networking platform or feed daily. Tips will rotate daily, such that one to two daily tips will appear in the participant's feed. Educational tips are also available in a searchable educational tips database, providing women with resources and advice in real time as they need it.

GPS-enabled resource locator. Resource location assistance is provided by a resource database, which includes local, state-level, and national resources relating to HIV care, mental health, violence, food insecurity, financial insecurity, legal aid, and other ancillary support service agencies. Women are able to search the resource locator database in a specified radius, by type of service or location, and all service descriptions include eligibility (including insurance requirements), hours, contact information, types of services offered, and alterations to operations due to COVID-19. By clicking on the address, the smartphone's GPS mapping app will be enabled to show the participant's location relative to the agency location. Women will have the option to comment and rate the agency (similar to Yelp functionality).

Medication self-monitoring and reminder system. HIV medication self-monitoring and reminders will be employed using a calendar function, on which women can schedule HIV medication reminders during their first virtual PN session. Women will receive automated medication reminders and be prompted to respond in real time to a question about whether or not they took their medications that day. Virtual PNs can also send reminder notifications to women through the WebApp or via text message. Women also have the option of tracking other behaviors or experiences, such as mood, doctor's appointments, or nutritional intake, and set reminders as desired.

Elicitation focus groups: Participants and procedure. Between March and April 2020, Black WLHA in San Diego and Oakland, California were recruited to participate in three elicitation focus groups (two for Black WLHA and one for peer navigators) to inform the development of the *LinkPositively* WebApp. We used multiple recruitment methods, including venue-based (e.g., at local HIV and ancillary support service organizations), flyer advertisements through HIV community advisory board members, phone contact with participants from previous HIV studies who provided permission to be contacted about participation in future studies, and word-of-mouth referrals. Participants were eligible if they (1) self-identified as a woman; (2) self-identified as African American, Black, or of African descent; (3) were aged 18 or older; (4) were living with HIV/AIDS; (5) resided in San Diego County, California, or Alameda County, California; (6) had ever experienced interpersonal violence, defined as physical, sexual, and/or psychological abuse by an intimate partner, family member, friend, or another person; (7) willing and able to give informed consent; and (8) able to understand English.

For focus groups of PNs, women must have had previous experience acting as a peer navigator to other WLHA. Interested participants were screened for eligibility via phone. Eligible participants were invited to participate in one of the scheduled focus groups.

The first focus group with WLHA was conducted in person and the remaining focus groups were conducted via Zoom videoconferencing due to physical distancing restrictions from the COVID-19 pandemic. Three female research team members were present at each focus group, including a facilitator, a note-taker, and a student observer. Each focus group lasted approximately 90 minutes and participants were compensated \$50 upon completion. All study procedures were approved by the Institutional Review Board of the University of California, San Diego.

The focus group guide was developed based on the proposed *LinkPositively* WebApp features, needs surrounding the use of a technology-based intervention, and needs regarding HIV care. Topics for the focus groups with WLHA included: comfort with technology, use of technology in everyday life, safety considerations when using technology, barriers and facilitators to retention in HIV care and ART adherence, the impact of violence on HIV care, and solicitation of options and recommendation for WebApp features based on mock-ups of each feature. Topics for the focus group with PNs included: solicitation of options and recommendation for the virtual peer navigation component of the WebApp and feedback on each of the 5 sessions that will serve to improve self-efficacy for coping, navigating social support networks, and tools to utilize support services effectively, all while addressing HIV stigma and medical mistrust.

Results

In total, nine participants attended three focus groups, including six Black WLHA and three Black WHLA PNs. Participants in the WLHA focus groups were between the ages of 44 and 69 and participants in the PN focus group were between the ages of 44 and 62 (data not shown). All participants identified as Black or African American, cisgender women, with none identifying as multiracial or Hispanic/Latinx. Of WLHA participants, 50% (n=3) attended some trade or vocational school or completed a bachelor's degree, while 33.3% (n=2) had not completed high school, and 16.7% (n=1) had completed high school. Of those with available data (n=2/3), PNs had completed at least some vocational or trade school. One of the WLHA participants were employed at the time of focus groups; none of the PNs were employed. Similarly, one of the WLHA and no PNs were in a relationship with an intimate partner at the time of focus groups.

Lifetime experiences of violence were assessed among focus group participants, indicating high prevalence of interpersonal violence experiences. Of WLHA, 83.3% (n=5/6) had experienced physical violence, 83.3% (5/6) experienced threats of physical violence, 67.7% (4/6) had experienced sexual assault, 33.3% (2/6) had experienced rape, 50.0% (3/6) had experienced threats of rape, 83.3% (5/6) had experienced emotional or psychological abuse, and 100.0% (6/6) had experienced attempts from others to control their behavior (e.g., where they go, who they see). Perpetrators were most commonly former intimate partners (83.3%, 5/6) and family members (33.3%, 2/6). Peer navigators with available data (n=2) had experienced physical violence (100%, 2/2, threats of physical violence (100%, 2/2), sexual assault (100%, 2/2), rape (50%, 1/2), threats of

rape (50%, 1/2), emotional/psychological abuse (100%, 2/2), and controlling behaviors (100%, 2/2). Perpetrators were most commonly a former intimate partner (100%, 2/2) or a family member (50%, 1/2).

All respondents (WLHA and PNs) reported themselves “somewhat” to “very able” to use mobile applications and websites in general and had previously used a mobile application or website to find out information about HIV (83.3% [5/6] of WLHA, 100% [2/2] of PNs) or track HIV care (83.3% [5/6] of WLHA, 100% [2/2] of PNs). Women living with HIV were very comfortable (50%, 1/2), somewhat comfortable (33.3%, 2/6), or not comfortable at all (16.7%, 1/6) with using a mobile application or website to track their HIV care, while 100% (2/2) of PNs were very comfortable doing so.

Results from the focus groups were compiled to assess salience of recommendations across groups, as well as feasibility of integration to the WebApp (Table 1).

***LinkPositively* WebApp adaptation.** Responsive to recommendations made by focus group participants, including Black WLHA and PNs, we undertook adaptation of the conceptualized *LinkPositively* WebApp to increase the culturally-tailored, gender-specific, and trauma-informed nature of the intervention (see Figure 2 for screenshots of components of the culturally-tailored *LinkPositively* WebApp). Additions fell into three broad categories: content, safety, and personalization. PNs also provided thoughts on their ability to navigate the peer navigation dashboard and interact with potential participants.

An essential element of the elicitation phase was to identify content and materials of interest and relevance to Black WLHA to be integrated into the WebApp. Women provided guidance both on topical content of interest, as well as how they would like content to be accessible to them. While the initial proposed topics for the educational tip component of the WebApp focused on syndemic conditions and their corollaries—including mental health, self-care, medication adherence, substance use, and violence—women encouraged the addition of topics that addressed their lives more holistically. Participants asked for information on their health such as nutrition and exercise, but also content relevant to their understanding of HIV, such as which medications to take, how to understand their labs, what HIV would look like as they aged, and news on current HIV research. Women requested guidance on how to have conversations with partners about their partners going on PrEP, how to disclose their status to loved ones, questions to ask their doctor, and responses to common misconceptions about HIV, in order to be armed with knowledge. These topics were integrated into the educational tip database in response, as were related topics. Further, women wanted to have information presented to them on their WebApp feed, rather than having to seek it out in the educational tip database. This prompted an alteration to the WebApp to display a new tip to participants each day, to engage them with content and knowledge. Additional suggestions included having topics posed for discussion on the WebApp feed, interactive comments, and a glossary for technical terminology. Finally, variety in the form of content was requested, including videos, links to articles, and integration of materials for printing, saving, or sharing.

The second major area of feedback concerned the safety and confidentiality of participants engaging in the testing of the *LinkPositively* WebApp. While safety features had been integrated from the conceptualization of *LinkPositively* to keep consistent with

Table 1.
RECOMMENDATIONS AND SALIENT NOTES FOR THE LINKPOSITIVELY WEBAPP FROM FOCUS GROUPS OF WOMEN LIVING WITH HIV/AIDS (N=6) AND PEER NAVIGATORS (N=3)

Webapp Element	Recommended Additions/Notes	Quotes
Profile Page	<ul style="list-style-type: none"> Recommend the option for a personal photo or an avatar Noted that choice in level of disclosure is vital 	<p>“The avatar is nice, but if you want to upload your own photo yourself or something [that would be good]” —WLHA</p> <p>“I wanted to be in care, but I’ve felt like I have a right to be in care [without] everybody knowing what I’m trying to be in care for.” —WLHA</p> <p>“It’s the thing of disclosure for a lot of women that I know of, [who] don’t use social media because they’re scared of someone knowing them on there, finding out that they’re positive—either [that, or] they don’t have somewhere they can have privacy alone to use the social media”—PN</p>
Social Networking	<ul style="list-style-type: none"> Like the “trigger warning” option to preemptively indicated that content may be disturbing or re-traumatizing Like the use of usernames to minimize unwanted disclosure Felt very positive about the potential of this to connect women to each other Felt that structured topics for discussion would be beneficial Commented that themes of empowerment are important—affirmations, empowerment-based language, etc. 	<p>“This is a really good idea . . . to have the [social networking] wall on there because . . . that’s something that, um, will connect women and also let women know that they are not alone dealing with this and it will also give women opportunity to link with women that are in their area that they don’t even know. So this is a great idea.” —WLHA</p> <p>“This I think would be great, because you know, people can go through . . . [and] use [the app] as they do with social media and be more interesting and keep them you know in and wanting to actually care more about taking care of themselves.” —WLHA</p> <p>“ . . . that’s when you get empowered, when you realize that you are not alone that there are grandmas, lawyers, doctors, there are a lot of people out here and this is not a stigma, it’s just an infection . . . ” —WLHA</p> <p>“In the African American community, with Black women, we already have enough stuff that tears us down as it is with negativity from family, friends, or whoever so when we’re diagnosed this adds to it and it’s even worse because a lot of the women when they get diagnosed not only do they have that feeling of I’m nothing anymore . . . ” —PN</p>

(continued on p. 175)

Table 1. (*continued*)

Webapp Element	Recommended Additions/Notes	Quotes
Education and Self-Care Tips	<ul style="list-style-type: none">• Suggested links to articles and videos embedded within the educational tips, to enable further learning and exploration• Suggested topics to add to educational tips: nutrition, exercise, PrEP for partners, medications (lawsuits or studies on medications, new medications coming out), HIV in the news, new research on HIV (including local HIV opportunities), how to disclose HIV to different people (doctor, family), responses to common misconceptions about HIV, how to understand your lab work, questions to ask your doctor, HIV across the life-course• Suggested considering terminology glossary for technical terms	<p>“HIV meds and helping people [with] just definitions of the meds, like a list of all the medications . . . and also . . . something to kind of like help to understand your lab work because that’s something that a lot of doctors will not explain to you unless you actually ask them to explain your lab work [and] your paperwork.”—WLHA</p> <p>“I still have a problem even now. It’s just letting people know just like my family know, like if I have a partner . . . when I tell my partner, I won’t look at him at his face and tell him cause I don’t wanna even hear or basically see their reaction, you know in case its negative. . . .”—WLHA</p>
ART Self-Monitoring and Reminders	<ul style="list-style-type: none">• Recommend option to color-code the calendar• Recommended option to add personal notes to calendar reminders• Suggested ability to receive text message or in-app reminders would be preferred• Recommend settings for one-time reminders instead of daily/weekly	<p>“I think the apps would be nice if they are on our phones. You can call or can make appointment reminders, so that will be a benefit of an app on the phone . . . if we have an app we can have medication reminders, appointment reminders”—WLHA</p> <p>“ . . . it will make it easier for people who don’t have or use email or something or people who don’t even check their emails really, they can do it . . . where you can use your phone, like where it sends you a text or something to your phone” —WLHA</p>
Resource Locator	<ul style="list-style-type: none">• Noted the importance of services specifically catering to Black Women and WLHA• Commented that they don’t feel like this resource exists for them anywhere	<p>“This [resource locator] is a very good idea because right now, when you go to 211 out here, their information is so outdated and some of the stuff they give you, places are closed down or either they don’t have the correct information on the place so this will be so helpful um for a person who is built to go on here and look up this kind of stuff and actually get accurate information!”—WLHA</p>

Table 1. (continued)

Webapp Element	Recommended Additions/Notes	Quotes
Peer Navigation (PN Focus Group only)	<ul style="list-style-type: none">• Suggested the integration of content to keep women regularly engaged• Noted concerns about accessibility: file uploads and downloads, access to technology, technological literacy• Felt system was usable	<p>“I like the fact that the peer can upload files for the participant to see. I don’t like . . . the participant trying to upload files, because where are they going to get them from? . . . you know if they need to scan them?”—PN</p> <p>“I like it because it kind of mimics how it would if you go to an agency or services, and it will be good for women that haven’t been in service . . . it will be a good way for them to kind of get used to ‘oh, this is how it would go if you actually go to an agency to get these services.’”—PN</p>
Peer Navigator Dashboard (PNs only)	<ul style="list-style-type: none">• Liked that there is a get-to-know-you session, good for meeting a participant or client where they are at.• Thought that use of video for PN sessions is going to be very important, seeing other women like you going through this	<p>“I like it because, for me it will keep me on track as far as, you know, doing my thing [as a PN] . . . so it will allow me to know . . . what I discussed with this person last time and it for me, it will keep me on track”—PN</p> <p>“I like the part of getting to know the person, to know . . . I’m gonna meet her where she’s at and I like that and . . . we’re allowing each other to get to know each other before we are even addressing some of the issues.”—PN</p> <p>“That’s how we want the ladies to feel right- you want them to feel connected and if they can see you [on a video call] and you can see them, they know they are not isolated.”—PN</p>
<hr/> <i>Note:</i> WLHA: women living with HIV/AIDS PN: peer navigator ART: antiretroviral therapy <hr/>

Figure 2. Screenshots of *LinkPositively* Web-App Components

a trauma-informed care approach, it was vital to the research team that we understood what made Black WLHA feel safe, not simply what we thought would make them feel safe. For example, a PN participant expressed concern over women having adequate private space to use the app:

... having the privacy or having a safe space in their environment to be able to use technology, to be able to have a meeting or group or ... one-on-one interaction ... they might have a violent partner ... it's scary, you know, when you trying to keep the women safe and give her ... all kind of plans ... so it's trying to give her services but ... who's protecting her to be able to access these services?

Another participant, from a WLHA group, pointed out:

... me being on the webpage, and somebody looking over your shoulder with all the HIV this and that actually on the page might not be something that I want to do ... you know, and somebody is over my shoulder or on the bus or what have you, so I have that issue with the app—going on the webpage and LinkPositively [app] you know.

Women responded positively to the possibility of a “safety exit” feature, which was proposed in the original conceptualization of *LinkPositively* prior to focus groups. This feature allows women to quickly exit the WebApp by clicking a button labeled “Exit Now,” causing them to be redirected to an unrelated page (e.g., Google.com), should they worry about inadvertent HIV disclosure. Women provided no comments for revision of the safety exit option; however, further discussion regarding this by the research team also prompted the integration of a feature to log women out of the WebApp automatically, in order to reduce the likelihood of a non-participant accessing their information or learning of their participation. Women also stressed the importance of choices around disclosure and confidentiality within the WebApp- features, such as being able to upload a picture or select an illustrated avatar, being able to use a username or their own name on their profile, and choosing the extent to which they post, and engage in comments and reactions to others’ posts, on the WebApp feed. Women also appreciated the “trigger warning” feature that warned other users that the post contained potentially upsetting content, to help themselves and others avoid content that could cause re-traumatization.

Thirdly, focus group participants emphasized the importance of an intervention customized for Black WLHA by Black WLHA. In each focus group, women shared that felt they had few resources and services intended specifically for Black WLHA, and how that contributed to mistrust and hesitance to access services. As one participant in a WHLA focus group said,

... you kind of get tired of not seeing yourself represented or you know, you want the support but then again, the issues are very different [between cultural groups]. I mean ... cultures have differences and we can all relate to your own culture and what those things are ... those idiosyncrasies, the differences in disclosure, ... relationships ... you know so there are a lot of things that we have [that are different]—being able to do this together and this for us [Black women], I’m really looking forward to it.

They expressed great enthusiasm about the customized content and emphasized that culturally competent and personalized development of the WebApp was previously unheard of among participants. Several WebApp features of this were integrated already, such as the centering of imagery of Black women of a variety of ages, and backgrounds and themes of empowerment. However, other features that allowed women to make the app feel like their own were suggested, and integrated: visual customization of the WebApp backgrounds, choosing how to receive notifications, and personalization of calendar notes. The *LinkPositively* WebApp, tailored to Black women in this regard, was identified as being an important positive change for participants who felt stigmatized and ignored:

I can't imagine the impact of . . . coming to the doctors and being a Black woman . . . and [the doctor] saying, hey, this is something just for Black women, why don't you check it out? I would have been all over this page, in my home, the privacy, my own time. I would learn faster without the stress of being on my cellphone maybe in public or whatever you know, and maybe . . . I would of gotten medicine sooner, because diagnosis is one thing, but then the diagnosis to getting in care can take forever, and that's a very critical time for women because you're getting diagnosed with something that is so stigmatic . . . our community is probably the harshest about the stigma . . . but then a doctor will give you this and say there are Black women who are positive in this city that are on this page right here and can answer any question you want to know. Some just got diagnosed yesterday or today like you, and some have been diagnosed for 20 years . . . I think it would be a huge encouragement for women to take their life and their health and their self-care into their own hands instantly, instantly.

Finally, PNs provided insights into their perceived ability to engage with women through the *LinkPositively* WebApp. PNs expressed their priority of confidentiality and access, noting that women would need to be taught how to use the WebApp, and that considerations for access to technology and technological literacy are paramount. Upon seeing the WebApp system, PNs felt that it would be easy to use to communicate with WLHA, and that the system could help to build social support networks and improve HIV care outcomes among WLHA.

Discussion

LinkPositively provides a new model to address the complex co-occurrence of interpersonal violence, syndemic co-morbidities, and socio-structural barriers in the engagement of the HIV care continuum for Black WLHA. A 2015 systematic review revealed no technology-based HIV self-management studies conducted in the U.S. specifically designed and culturally-tailored for use with Black WLHA.⁷⁶ We successfully demonstrated that it is possible to develop a WebApp system through engagement and integration of feedback from target end users. In this process, we were also able to account for direct (self-efficacy for coping, social support) and indirect (HIV stigma, medical mistrust) socio-structural mechanisms of change, specific to Black WLHA affected by interpersonal violence. Further, we anticipate that the culturally-tailored, gender-responsive, and trauma-informed intervention will be acceptable to

Black WLHA and feasible to implement as a scalable intervention to improve HIV care continuum outcomes among Black WLHA. Next steps will include beta testing of the *LinkPositively* WebApp, followed by a randomized, controlled pilot study of the *LinkPositively* WebApp among Black WLHA in California.

LinkPositively responds to disparities in the HIV care continuum among Black WLHA affected by interpersonal violence. *LinkPositively* will be a first-of-its-kind mobile phone app with five innovative virtual components. For women, the virtual nature of peer navigation, informal social support, education and self-care tips, resource locator, and medication reminders will likely facilitate retention in care and ART adherence. For providers, the virtual PN approach is an invaluable option for resource-constrained settings. If demonstrated to be efficacious in a subsequent large-scale trial, *LinkPositively* will shift the HIV treatment paradigm for Black WLHA in the U.S.

Acknowledgments

This research was supported by the National Institute of Mental Health (NIMH Grant #R34MH122014). K. Tsuyuki was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA Grant #K01AA025009) and the National Institute on Minority Health and Health Disparities (NIMHD Grant #L60MD012089). All authors acknowledge support by the UC San Diego Center for AIDS Research (Grant #P30AI036214). The content of this article is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies. We thank the study participants who generously provided formative data for this research. We also thank WORLD (Women Organized to Respond to Life-Threatening Diseases) for their support on this project.

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