

Reduction in a high-risk sex script among young urban women in the Love, Sex, & Choices web video HIV prevention intervention study

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For women, the high-risk sex script of condomless sex to maintain relationships with men is concerning, particularly in regard to heterosexual HIV acquisition. This secondary analysis of data from a clinical trial evaluated the effect of a 12-episode, web-based video series intervention, entitled Love, Sex, and Choices, versus a text message control on lowering the high-risk sex script. The sample comprised 238 predominately urban Black women, ages 18–29, having HIV sex risk behavior. Data were collected at baseline and 6 months post-intervention. The Sex Script Video Response score was used to measure a high-risk sex script. HIV sex risk behavior was measured by Vaginal Equivalent Episodes with high-risk partners. At baseline, lower education, younger age at first sexual intercourse, and alcohol/non-injection drug use before sex were positively associated with a high-risk sex script. At baseline, as the high-risk sex script increased by one log unit, sex risk behavior increased by 0.47 log units ($p < 0.001$), equivalent to a 60% increase in the geometric mean of sex risk behavior. ANCOVA analysis indicated that from baseline to 6-months post intervention, lowering the high-risk sex script by one unit was associated with an additional reduction of 0.26 units in sex risk behavior. Compared to the text messages, the LSC video series was associated with a 27% greater reduction in the geometric mean of the sex script ($p = 0.03$). Further investigation into the effect of lowering sex scripts to reduce sex risk behavior is recommended.

KEYWORDS

HIV risk, sex scripts, web-based soap opera video intervention, women

1 | INTRODUCTION

Sex scripts are expectations about sex behavior that influence how a person may interpret and respond sexually (Gagnon & Simon, 2005). Sex Script Theory, introduced with the publication of *Sexual Conduct* (Gagnon & Simon, 1973), challenged the deterministic view of sexual life as a universal response to biological needs and drives (DeLamater & Plante, 2015; Gagnon & Simon, 2005). Sexual conduct came to be more widely understood from a social constructionist perspective

(DeLamater & Plante, 2015; Wiederman, 2015), as a phenomenon that varies with local cultural, subcultural, and historical contexts (Gagnon, 1990; Gagnon & Simon, 2005). Understanding that expectations for sex behavior are socially scripted opened possibilities for a more egalitarian and emancipated view of sexual expression that could lead to innovative interventions to promote sexual health.

Since the introduction of Sex Script Theory, a substantial body of work has recognized that sexual thoughts, behavior, and relationships manifest as social phenomena (DeLamater & Plante, 2015). Identifying

specific sex scripts that influence sexual behavior can guide the development of interventions to promote awareness that there are choices in sexual relationships, and cultivate a sense of freedom to actualize these choices (Barrett, 1998; Jones, Hoover, & Lacroix, 2013). Movement away from a pervasive script is important because realizing there are choices, new sex scripts can catch-on and provoke change on a wider geographic level (Masters, Casey, Wells, & Morrison, 2013), particularly with the advent of social media (Jones, Lacroix, & Porcher, 2017).

Interest in sex scripts has informed studies on HIV sexual risk behavior in diverse populations (Bowleg et al., 2013; Hussen, Bowleg, Sangaramoorthy, & Malebranche, 2012). The sex script examined in the parent study of this report was the belief that it is necessary to engage in condomless sex to fulfill relationship needs (Jones et al., 2013). Illustrations of this commonly held script are that women should "do whatever it takes" to keep a man, "as long as he comes home to me," and "as long as you're doin' your job, he won't leave" (Jones & Oliver, 2007 p. 815). This script is a patterned response to satisfy a high-valued need for relationship and emotional connection (Bell, Atkinson, Mosier, Riley, & Brown, 2007; Jordan, 2009).

The importance of heterosexual HIV transmission in women has provoked heightened attention to an already concerning sex script that serves to undermine women's autonomy. Condomless sex with HIV infected men accounts for 86% of HIV transmission in women (Centers for Disease Control and Prevention (CDC), 2017). Among women with HIV, Black women are disproportionately infected (61% compared to 19% white women, and 15% Latina) (CDC, 2017). Although women may perceive their male partners are engaging in HIV risk behaviors, some women still choose to engage in condomless vaginal and anal sex (Jones et al., 2013; Ober et al., 2011), perhaps, because of a high-risk sex script.

Here, we conducted a secondary analysis of data concerning a high-risk sex script. These data were obtained from a parent study that was a randomized controlled trial to determine the effect of a 12-episode soap-opera type, web-based video series, Love, Sex, & Choices (LSC), compared to text-based HIV prevention messages on lowering HIV sex risk behavior in young adult, urban women. Most of the sample was African American (88.2%), with close to 12% Latina or Caribbean. Findings from the parent study indicated that the group receiving the LSC video series demonstrated a 19% greater post-intervention reduction in sex risk behavior than the text group (Jones et al., 2013). The difference between intervention and control groups was not statistically significant in the sample of 238, suggesting the study may have been underpowered to detect a difference between the groups. Findings from the parent study did, however, show that participants in the LSC video group had a high level of identification with the characters and story (Jones et al., 2013).

The purpose of this secondary analysis was to explore several questions from the parent study regarding the correlates of ascribing to a high-risk sex script, and correlates of change in the sex script over time, including whether the LSC video intervention had a differential impact on the sex script. In this analysis we also sought to examine potential links between sex scripts and sex risk behavior at baseline

and over time. The answers to these questions will inform HIV prevention interventions.

2 | BACKGROUND

2.1 | Relevance of sex scripts

Sex scripts influence how a person interprets an experience as sexual. The experience is associated with widely held understanding and prior knowledge (Stacy & Wiers, 2010). Because sex scripts are socially created, the symbolic meaning of sex behaviors can be more readily interpreted (Simon & Gagnon, 1986). One can decode the moment as sexual, define one's own feelings, organize the sequence of sexual responses, and behave according to the sexual norm of the time (Gagnon & Simon, 1973).

According to Sex Script Theory, sex scripts are shaped at three levels: cultural, interpersonal, and intrapsychic. The cultural level refers to one's environment, its institutions, and mass media. Cultural scenarios are far too general, however, to fully guide a couple's sexual behavior in specific situations. Interpersonal scripts are the ways couples interpret and improvise their existing scripts. Interpersonal scripts allow the couple to adapt the sex script as they work through the narrative together. As one's sex scripts are modified to meet a partner's expectations, couples show high or low levels of improvisation or conformity to cultural scripts (Gagnon, 1990). Intrapsychic sex scripts include personal fantasies, imagery, and memories so a person may imagine how a private world of wishes and desires may be fulfilled within sexual relationships and in the general context of the cultural script (Simon & Gagnon, 1986; Wiederman, 2015). Understanding one's own feelings from the perspective of the script involves coordinating emotions, thoughts, and behavior with those of one's partner (Gagnon, 1990). Thus, there is a conceptual basis for how changing sex scripts may relate to change in sex behavior.

Rigid sex-scripted beliefs about gender roles are important in forming high-risk sex scripts (Eagley & Wood, 2003; Santana, Raj, Decker, Marche, & Silverman, 2006). Examples are the belief that men control the decision to use condoms (Biello, Sipsma, Ickovics, & Kershaw, 2010; Krishnan et al., 2008) and to initiate sex (Jones & Gulick, 2009). Such beliefs translate into women acquiescing to behavior that places them at risk. For example, findings support an association of men's adherence to masculine gender ideologies with engaging in condomless sex (Santana et al., 2006) and having multiple partners (Bowleg et al., 2011). These beliefs limit women's awareness of a range of choices that could be available in the context of sexual and gender equality (LaFrance, 2010; Morokoff, 2000; Sanchez, Kiefer, & Ybarra, 2006). Economic and racial disparities can further limit such choices among the most disenfranchised women (Fasula et al., 2014; Wyatt et al., 2013). Alternatively, women who succeed at redefining rigid gender scripts are more likely to characterize themselves as being aware and powerful. Being powerful means that women set an intention and follow through to effect the changes they want to make (Jones, 2006). Altering one's sex script was the basis of developing the LSC video intervention.

2.2 | Higher power sex scripts mean pursuing intentional choices

“Power is the capacity to participate knowingly in change. Knowing participation is the key” (Barrett, 2010, p. 14). Power is a process of one’s awareness, choices, freedom to act intentionally, and involving oneself in making the changes happen (Barrett, 2010). In previous research by the first author, sex scripts were viewed to be lower or higher power (Jones & Oliver, 2007). In a lower power sex script, a woman viewed herself as “having to satisfy her man.” Lower power sex scripts are characterized by beliefs that sexual choices are largely determined by male partners. A higher power sex script involves an expanding awareness of one’s own value as a woman, coupled with an awareness of what one really wants from a relationship, and the recognition that there are choices. Finally, a higher power sex script means engaging the will to act to realize one’s choices. These choices may mean using condoms, abstaining from sex, or leaving a partner.

This secondary analysis was conducted to meet two key objectives. The first was to determine the demographic and other predisposing correlates of a high-risk sex script at baseline and correlates of change in the sex script over time, including if the LSC video intervention of the parent study had a differential impact on the sex script. The second objective was to determine if a higher risk sex script was associated with sex risk behavior at baseline, and whether a decrease in the higher risk sex script from baseline to post intervention was associated with a decrease in sex risk behavior.

3 | METHODS

3.1 | The parent study

This is a secondary analysis of data from a clinical trial that involved comparing an intervention, comprising a 12-episode, soap-opera type, web-based video series, *Love, Sex, & Choices* (LSC), to a text message control. Although the text message was technically an intervention, it is referred to as a control in this paper to emphasize that the video was the intervention being tested. Both the intervention and the control focused on reducing sex risk behavior in young adult, urban women. To create LSC, formative work was conducted to develop authentic characters, character trajectories, and situations woven into a story that would resonate with the intended audience while communicating health promoting messages. Data from a series of focus groups were analyzed by open and axial coding (Jones et al., 2013). The content analysis was guided by the framework of Power as Knowing Participation in Change Theory (Barrett, 2010) and Sex Script Theory (Gagnon & Simon, 2005).

The LSC story followed a narrative arc whereby, except for one character, lead female characters became more powerful. That is, they became more aware of their own worth, making choices intentionally, feeling free to pursue such choices, and taking the steps to make those choices happen. One female character did not follow this trajectory, demonstrating her own sense of persistent loneliness, seeking love and connection through dangerous liaisons. The theorized process was

that the viewer would identify with one or more of the lead characters who faced some difficult relationship dilemmas and, through a process of power as knowing participation in change, transformed their behavior. This led to higher power sex scripts, consisting of sexual autonomy and attaining the choices the lead characters had intended to make. Health promoting behaviors are shown as a consequence of this process. The series was divided into 12, 15–20 min episodes, streamed weekly to smartphones.

The control group received 12 HIV-prevention text messages. These were developed to communicate ways to reduce HIV sex risk. The messages were consistent with current CDC recommendations and the theoretical framework. A sample message was: “Sexual health means respecting your own rights and feelings” (Jones et al., 2013, p. 208).

The LSC video was developed to reduce high-risk sex scripts with the understanding that by reframing sex scripts, over time, risk reducing behaviors could become a new response to emotionally challenging situations (Stacy, Newcomb, & Ames, 2000). After data collection at baseline as described below, the study participants were randomized into the LSC video series intervention group ($n = 117$) and the text message control group ($n = 121$), with further data collection at 3 and 6 months later. More details on the parent study and the interventions can be found elsewhere (Jones et al., 2013).

3.2 | Participants and setting

Women, aged 18–29 years old, who were in a sexual relationship with a man either currently or within the previous three months, were eligible for a baseline screening interview to determine HIV sex risk. Flyers were used to recruit the sample. The flyers were distributed by neighborhood recruiters who were members of the study team and research assistants, or posted at a community center, a storefront office in a downtown shopping center, two public housing developments, two sexually-transmitted disease clinics, and a food pantry. On assigned days, the study team visited the sites and met participants to conduct the screening interview. Each recruitment site was located in a predominantly low-income African American and Black community in New Jersey that also showed high HIV prevalence. Data were collected in high HIV prevalence neighborhoods following the CDC High Impact HIV Prevention recommendations (CDC, 2015), to target prevention efforts to those at highest risk.

Audio computer assisted self-interview (ACASI) was used to conduct the baseline, 3 month, and 6 month post-intervention surveys (Jones, 2012a; Jones, 2012b; Pluhar et al., 2007). The ACASI was programmed to follow an algorithm that categorized the participant’s level of HIV sex risk (high or low) based on their responses to the screening survey. Women categorized as high risk were eligible for the 6-month long study. High-risk classification was based on having engaged in at least one episode of condomless vaginal or anal sex with a man whom the participant perceived to have either engaged in sex with other women, had sex with men, or used injection drugs during the past three months. Before the screening survey, participants read or listened to the online consent on the tablet personal computer used

by the study team and checked a box to indicate agreement to participate in the screening procedure. If the woman was categorized as high-risk for HIV and invited to participate in the study, a second online consent was presented for online review. After the consenting process was completed, the video and text interventions were delivered on study provided smartphones. More detail on participants, sites, and study design are reported elsewhere (Jones et al., 2013).

3.3 | Data collection instruments

3.3.1 | Demographic

Demographic characteristics that include age, race, site, and level of education, were collected on the screening survey. The items assessing use of drugs or alcohol before or during sex, HIV testing in the past 3 months, whether the partner was tested for HIV in the past 3 months and discussing HIV testing with one's partner(s) were evaluated at baseline and 6 months.

3.3.2 | HIV sexual risk behavior

Sex risk behavior was measured by the Vaginal Episode Equivalent (VEE; Berkman, Cerwonka, Sohler, & Susser, 2006; Susser, Desvarieux, & Wittkowski, 1998). We adapted the VEE to calculate condomless sex with a perceived high-risk partner (HRP). The VEE is the total number of condomless vaginal and anal sex acts in the past 3 months with each HRP. A high-risk partner is a man whom women believe may be having sex with another woman, and/or sex with men, and/or injecting drugs in the past 3 months (Jones et al., 2013).

3.3.3 | Measuring sex scripts with Sex Script Video Response

The Sex Script Video Response (SSVR) was created to assess for agreement with the high-risk sex script that condomless sex was needed to begin and preserve a relationship with a man (Jones et al., 2013). First, a 5-min vignette was viewed, titled, the Kayla and Steve Sex Script Video (SSV). In the vignette, Kayla's partner Steve, had not visited or communicated with her in several days. The vignette depicts her growing concern and tension as she waits for him to respond to her calls and texts. When Kayla walks to the neighborhood store, she observes Steve talking to a woman who was rumored to be seeing him. Visibly upset, Kayla returns home. To her surprise, later that day, Kayla receives a message from Steve asking if he can stop by for a visit. The vignette ends. The participant then completed the SSVR that assessed what the participant thought happened next (Jones & Gulick, 2009; Jones et al., 2013).

The 6-item SSVR consists of details concerning what the participant herself would do if faced by the situation depicted in the vignette (Cronbach's $\alpha = 0.73$). An example of an item on this scale is "If you were in this situation, would you have sex with Steve?" (Jones et al., 2013, p. 210). The response options were on a five-point scale: "No," "Don't think so," "Maybe," "Think so," and "Definitely yes." Higher scores on the SSVR represent a greater expectation to engage in

condomless sex to begin or maintain a relationship. The SSVR was completed at baseline and at 3 and 6 months post intervention by both the intervention and control groups (Jones et al., 2013).

3.4 | Data analysis

Categorical variables were compared for proportions using exact tests. Continuous variables were described and compared by means. Continuous variables with high skewness (i.e., greater than 3) were log base e transformed (after adding 0.5 when needed to prevent values of 0) to obtain acceptable normal approximation for inferential analysis (Nunnally & Bernstein, 1994) and are thus reported in log units. Such skewed variables included SSVR sex script scores and VEE-HRP sex risk behavior scores. For the log transformed variables, exponentiation of the mean-log obtains geometric means that are roughly equal to the median of the non-transformed original variable scale. Standard errors (SE) for the geometric means were obtained using the delta method (Casella & Berger, 2002). Paired t -tests evaluated change within the same persons from baseline to the 6-month post-baseline visit.

Multivariate linear regression models were fit to the log of the sex script score (SSVR) at baseline using all variables significant at $p < 0.05$ in unadjusted analyses. Linear regression models were used to examine associations between baseline characteristics and pre to post intervention change in the log transformed SSVR scores using Analysis of Covariance (ANCOVA) where the baseline value of the outcome was included as a predictor (Cramer, 1987) to remove regression to the mean effects and improve the precision of estimates. Only one variable was statistically significant at $p < 0.05$ in the pre-post intervention change model of the SSVR score, so no multivariate model was fit when measuring change in the SSVR score. Similarly, linear models for baseline log (sex risk + 0.5) using the baseline SSVR score and other baseline variables as predictors, and ANCOVA linear models for change in sex risk (VEE-HRP) from baseline to follow-up, were fit using change in the log SSVR scores from baseline as a predictor.

4 | RESULTS

4.1 | Description of the study sample

Of 238 participants, 210 (88.2%) were African American or Black—the remaining 28 participants were Latina or Caribbean (11.8%). Because this is a secondary analysis, the baseline characteristics of the overall sample presented in Table 1 reflect some information previously published (Jones et al., 2013). Just over one-fourth of the participants (26.1%) completed 11th grade or less. Eighty-six (36.1%) participants completed 12th grade, 78 (32.8%) completed one or two years of college, and 5.0% completed more than 2 years of college. The mean age of the participants was 22.0 years. The mean reported age of first sex was 14.4 years. Most participants (62.0%) were unemployed. Nearly 80% had used alcohol or non-injection drugs during sex in the prior 3 months. Injection drug use was rare, occurring in only 7 (3.2%) of the sample.

TABLE 1 Descriptive baseline characteristics for the urban predominantly African American women study population

Variable	M (\pm SD) or n (%)
Age (years)	22.0 (\pm 3.5)
Age at first sexual intercourse (years)	14.4 (\pm 1.9)
Highest grade completed	12.2 (\pm 1.4)
Employment outside the home	91 (38.0%)
Study site	
Community center	39 (16.4%)
Public housing	73 (30.7%)
Food pantry	29 (12.2%)
Storefront	43 (18.1%)
STD clinics	54 (22.7%)
Baseline partner sex and drug behavior in past 3 months	
Male partner had sex with other women	217 (91.6%)
Male partner had sex with men	37 (15.6%)
Male partner injected drugs	24 (10.1%)
Baseline VEE-HRP log-units	3.02 (\pm 1.53)
Geometric mean(\pm SE) ^a	20.50 (\pm 2.01)
Baseline SSVR in log-units	1.07 (\pm 1.41)
Geometric Mean(\pm SE) ^a	2.92 (\pm 0.27)

VEE-HRP is Vaginal Equivalent Episodes to measure sex risk behavior with high-risk partners; SSVR is Sex Script Video Response, a measure of the high-risk sex script.

^aObtained as described in the Methods section. Because this variable was skewed, the geometric mean was used to approximate the median of non-transformed values.

The overall mean log transformed SSVR score at baseline (with higher scores indicating higher expectations of condomless sex) was 1.07 log units with a geometric mean of roughly 3, that corresponds to the median of the untransformed values. Consistent with eligibility requirements to participate in the study, all participants had vaginal and/or anal condomless sex in the past 3 months with a perceived high-risk partner. The mean baseline Vaginal Equivalent Episode with a high-risk partner (VEE-HRP) score on the log scale was 3.02 at baseline, corresponding to a median of roughly 20 unprotected vaginal sex acts with a high-risk partner in the previous 3 months. More details on the study population have been published previously (Jones et al., 2013).

4.2 | Potential predisposing characteristics to high-risk sex scripts at baseline

Table 2 presents associations of baseline log transformed SSVR score with potential predisposing demographic and behavioral characteristics from the linear regression models. Sex risk behavior (VEE-HRP) is addressed later as it is likely a consequence rather than a predisposing factor for the SSVR score. In unadjusted models, the strongest correlate of a higher-risk SSVR score was age at first sex (-0.92 log units SSVR per 5 years age, $p < .0001$), indicating that the first sexual intercourse at a younger age was strongly associated with a current

belief in a high-risk sex script. Completion of a higher-grade level was associated with a lower SSVR score (0.87 log units lower per 5 years, $p = 0.007$), whereas, use of alcohol or drugs before or during sex (0.68 log units for yes vs. no, $p = 0.002$) was associated with a higher SSVR score. All recruitment sites were significantly associated with a higher SSVR score as compared to recruitment from public housing, each at $p < 0.05$. In multivariate analysis, these variables remained statistically (all at $p < 0.05$) associated with the higher risk SSVR score at baseline.

4.3 | Change in the high-risk sex script from baseline to follow-up by intervention arm

The pre-post intervention changes in the SSVR scores for the 117 study participants randomized into the LSC video intervention and the 121 randomized into the HIV prevention text message control in the parent study are displayed in Table 3 (Jones et al., 2013). Both groups had statistically ($p > 0.05$) similar log SSVR scores at baseline with means of 1.16 versus 0.98. Between baseline and the 6-month follow up, the SSVR scores declined statistically for both groups by means of -0.81 log units ($p < 0.001$) for the video intervention and -0.38 log units ($p < 0.001$) for the text message control. Converting these to the original units by exponentiation, this corresponded to median follow-up SSVR scores of 44.5% ($\sim 100 \times \exp(-0.81)$) as high as the baseline score in the LSC video arm and 68% ($\sim 100 \times \exp(-0.38)$) as high as the baseline score for the text message control. This means that the video intervention showed a statistically significant greater baseline to follow-up decline in the SSVR score as compared to the text message control ($p = 0.03$).

4.4 | Other potential predisposing characteristics to change in the high-risk sex script from baseline to follow-up

Table 4 expands on Table 3 to include associations of baseline variables with baseline to follow-up change in the log transformed SSVR score. The parameter estimates and statistical significance presented in Table 4 are from ANCOVA linear regression, which adjusts for baseline log SSVR scores to control for regression to the mean influences in the change. In these ANCOVA models, the only statistically significant association was for the intervention assignment, with a -0.32 greater decline in log transformed SSVR score ($p = 0.03$) in the video intervention compared with the text message control. It should be noted that the value in Table 4 reflecting the comparison of the video and text message interventions (-0.32), differs slightly from the absolute difference in the mean log declines of -0.43 ($= -0.81$ to -0.38) in Table 3 due to the adjustment for the baseline SSVR values and other covariates in the ANCOVA model. Translated into an effect of geometric mean, this was a 27.5% greater reduction in post intervention SSVR scores for the video intervention. As there was only one statistically significant predictor in the unadjusted analyses, no multivariate model for predictors of pre-to-post baseline change of sex script was fit.

TABLE 2 Associations of baseline log-transformed Sex Script Video Response with potential predisposing characteristics in linear regression models

Variable	Unadjusted association		Adjusted association	
	Beta (\pm SD)	<i>p</i>	Beta (\pm SD)	<i>p</i>
Intervention arm assignment Video vs. text	0.19 (\pm 0.18)	0.30	NA	
Age (per 5 years)	0.16 (\pm 0.26)	0.55	NA	
Age at first sexual intercourse (per 5 years)	-0.92 (\pm 0.22)	< 0.001	-0.59 (\pm 0.24)	0.01
Highest grade completed (per 5 years)	-0.87 (\pm 0.32)	0.007	-0.62 (\pm 0.32)	0.05
African American/Black vs. Other	0.24 (\pm 0.29)	0.04	NA	
Employment outside the home Yes vs. No	-0.39 (\pm 0.19)	0.41	NA	
Recruitment site vs. public housing				
Community center	-0.81 (\pm 0.27)	0.01	-0.70 (\pm 0.27)	0.008
Food pantry	-0.32 (\pm 0.31)		-0.23 (\pm 0.30)	
Downtown storefront	-0.67 (\pm 0.26)		-0.47 (\pm 0.26)	
STD clinics	-0.71 (\pm 0.24)		-0.37 (\pm 0.25)	
Used alcohol or drugs before or during sex during last 3 months Yes vs. No	0.68 (\pm 0.22)	0.002	0.45 (\pm 0.23)	0.05

Only variables that were statistically significant at $p < 0.05$ in unadjusted analyses were included in the final model.

4.5 | Association of the high-risk sex script with sex risk behavior

Lastly, we examined associations between the SSVR score with the outcome, condomless sex with high-risk partners as measured by VEE-HRP. In Table 5, associations are first shown for the baseline SSVR score with baseline VEE-HRP sex risk. For each log unit increase at baseline for log transformed SSVR score, log transformed sex risk (VEE-HRP) increased by 0.47 log units ($p < 0.0001$). Inclusion of other baseline covariates did not change the association between baseline sex scripts and sex risk behavior.

Table 5 next shows that within each person, a change in that person's SSVR score from baseline to follow-up was also associated with change in that person's sex risk behavior (VEE-HRP). For a given person, a decrease of 1 unit in log SSVR score from baseline to follow-up was associated with a mean decrease in log VEE-HRP sex risk behavior of 0.26 units. In other words, if a woman's sex script score declined (improved) by one log-unit from baseline to follow-up, then

the sex risk behavior score declined by -0.26, roughly a median of 77% ($\sim 100 \times \exp -0.26$) as many high-risk sex acts as at baseline.

5 | DISCUSSION

At baseline, lower completed level of education, younger age at first sexual intercourse, and using alcohol or non-injection drugs before or during sex were all independently and significantly associated with having a higher-risk sex script in this urban population of predominantly late adolescent and young adult African American or Black women. The higher-risk sex script at study entry was strongly associated with having higher sex risk behavior.

It is encouraging that the Love, Sex, & Choices (LSC) video intervention, which targets a pervasive high-risk sex script, was associated with a decline in the sex script. In the ANCOVA models of pre-post intervention change in the SSVR score, the only independently statistically significant association with the sex script was for the video intervention, with a -0.32 greater decline in the log transformed sex script that corresponded to a greater decline of $\sim 27.5\%$ in the geometric mean ($p = 0.03$). No other baseline covariates were associated with a change in the sex script.

Although not statistically significant, findings from the parent study showed a greater pre-to-post intervention decline in sex risk behavior of 0.27 log units for the video intervention versus the text message control. This secondary analysis yielded evidence that the video series had a statistically meaningful effect in reducing a high-risk sex script. It is thus arguable that the reduction in the high-risk sex script from the video intervention may lead to a greater reduction in sex risk behavior in the video intervention group, but at a level that was too small to observe statistically with the existing sample size.

TABLE 3 Baseline to six-month follow-up intervention changes in log transformed Sex Script Video Response by intervention arm

Intervention arm	Baseline	Six-month follow-up	Change
	M (\pm SD)	M (\pm SD)	M (\pm SD)
Video	1.16 (\pm 1.45)	0.35 (\pm 1.28)	-0.81 (\pm 1.50) ^{a,b}
Text control	0.98 (\pm 1.36)	0.60 (\pm 1.28)	-0.38 (\pm 1.30) ^{a,b}

^a $p < 0.001$ for a decline in baseline to follow-up in both the video and text arms by paired *t*-tests.

^b $p = 0.03$ for a greater decline in the video than the text arm from ANCOVA models.

TABLE 4 Associations of variables with change in log transformed Sex Script Video Response from baseline to follow-up in linear regression models

Variable	Unadjusted association ^{a,b}	
	Beta (\pm SD)	<i>p</i>
Intervention arm assignment Video vs. text control	-0.32 (\pm 0.15)	0.03
Age (per 5 years)	0.94 (\pm 1.77)	0.39
Age at first sexual intercourse (per 5 years)	0.27 (\pm 0.19)	0.17
Highest grade completed (per 5 years)	-0.20 (\pm 0.26)	0.44
African American/Black Yes vs. No	0.19 (\pm 0.24)	0.41
Employment outside the home Yes vs. No	-0.09 (\pm 0.16)	0.55
Study site vs. Housing		
Community center	0.03 (\pm 0.23)	
Food pantry	0.39 (\pm 0.26)	0.38
Downtown storefront	0.17 (\pm 0.22)	
STD clinics	0.24 (\pm 0.21)	
Used alcohol before or during sex Yes vs. No	0.05 (\pm 0.18)	0.79

^aFrom an ANCOVA model that adjusted for baseline log-SSVR as a covariate.

^bNo adjusted model was fit since only one variable was associated at $p < 0.05$ in unadjusted analysis.

Supporting the possibility that lowering the high-risk sex script could also lower sex risk behavior was that at baseline, higher risk SSVR scores were strongly associated with higher VEE-HRP sex risk behavior scores. As the baseline sex script score increased by one log unit, the baseline sex risk behavior score increased by 0.47 log units. Further supporting the likelihood that a reduction in a high-risk sex script could lower sex risk behavior was our observation that a reduction in the sex script from pre-to-post intervention was related to a reduction in sex risk behavior. If the pre-to-6-month post intervention sex script score was reduced by one log unit then this reduction would be associated with an additional decline of 0.26 log

units for sex risk behavior scores from baseline to post intervention, equating to roughly a median of 77% as many high-risk sex acts.

This study was limited by the use of self-reported data. Several efforts to reduce potential bias in self-reporting were implemented, however, including use of ACASI, recall for a shorter but representative time period, and calendar reminders to show the 3-month time period for which participants were reporting (Jones, 2012b). Only one high-risk sex script was explored in this study population, that of the importance of engaging in condomless sex to accomplish what women believe either from direct experience or common understanding, as the surest method to satisfy men to gain and hold valued partnered relationships with men. This sex script may not be as common in younger or older women, or women of different cultural backgrounds.

In conclusion, we found that at baseline, lower education, lower age at first sex, and the use of alcohol and non-injection drugs before or during sex were all independently associated with having a higher-risk sex script. The higher-risk sex script at baseline was strongly associated with having higher sex risk behavior. In this secondary analysis of data from the parent study, the LSC video intervention was shown to lower the high-risk sex script. Our finding here, that reduction in this high-risk sex script from baseline to follow-up was associated with a reduction in sex risk behavior and that LSC exerted a statistically significant greater effect on sex script compared to the text control, suggests the potential usefulness of the video intervention. Further investigation to test the effect of lowering high-risk sex scripts to effect reduction in sex risk behavior is recommended.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ETHICAL APPROVAL

Informed consent was obtained from all individual participants included in the study. All procedures performed in this study involving human participants were in accordance with the ethical standards of

TABLE 5 Associations of Sex Script Video Response and Love, Sex, & Choices with Vaginal Equivalent Episodes with a high-risk partner in linear regression models

A. Association of baseline log-SSVR with baseline log VEE-HRP		
Predictor variable	Outcome is baseline log VEE-HRP	
	Beta (\pm SD)	<i>p</i>
Baseline log-SSVR	0.47 (\pm 0.01)	< 0.0001
B. Association of pre-to-post baseline change in log SSVR with pre-post baseline change in VEE-HRP ^a		
Predictor variable	Outcome is pre-post baseline change in log VEE-HRP	
	Beta (\pm SD)	<i>p</i>
Pre-post baseline change-in-log-SSVR	0.26 (\pm 0.09)	< 0.0001

SSVR is Sex Script Video Response, a measure of the high-risk sex script; VEE-HRP is Vaginal Equivalent Episodes to measure sex risk behavior with high-risk partners.

^aFrom ANCOVA Models including baseline sex risk behavior (VEE-HRP) as a covariate.

the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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