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A Longitudinal Examination of Risk and Protective Factors Associated with Drug Use and Unsafe Sex among Young African American Females

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Abstract

This study prospectively examined associations among multiple theoretically informed risk (e.g., depression, sexual sensation seeking, and risky peers norms) and protective factors (e.g., social support, STI knowledge, and refusal to have sex self efficacy) on unsafe sex among 715 African American adolescent females aged 15–21 who participated in an STI/HIV prevention intervention. Generalized estimating equation models were used to assess associations between baseline characteristics and sexual risk over a 12-month follow up period. Overall risk in this population was high: at baseline, nearly a third of women reported sex under the influence of alcohol or substances; ≥ 2 partners for vaginal sex, and casual sex partners in the 60 days prior to baseline, and nearly 75% of those reporting vaginal sex used condoms inconsistently. In multivariable analysis, when risk and protective factors were simultaneously considered, higher levels of sexual sensation seeking were associated with having multiple sex partners and inconsistent condom use. Greater perception of risky peer norms was associated with a higher risk of having sex under the influence of alcohol or drugs. In addition, higher sex refusal self-efficacy was protective against having multiple; casual; and concurrent sex partners. Incorporating these salient factors into prevention programs may be critical to the development of targeted interventions for this population.

Keywords

Prospective study; African American females; risk and protective factors; unsafe sex

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1. Introduction

In the United States (U.S.), compared to their white and Latina peers, young African-American females bear a disproportionate sexually transmitted infection and (STI) and human immunodeficiency virus (HIV) burden. For instance, African-American females (ages 15 to 19), are 95 and 61 times more likely to be infected with chlamydia than their Latina and white female counterparts respectively (Centers for Disease Control and Prevention, 2009). Furthermore in 2009, it is estimated that rates of HIV among African American females aged 13 to 29 were 15 and 3 times higher than among white and Latina women respectively (Centers for Disease Control and Prevention, 2011). From a behavioral perspective, unsafe sexual practices can lead to the transmission of STI/HIV infections among youth. Behavioral factors such as having a high number of sexual partners and inconsistent condom use increase the risk of contracting STIs including HIV (Crosby, DiClemente, Wingood, Lang, & Harrington, 2003; Paz-Bailey G, 2005; Santelli, Brener, Lowry, Bhatt, & Zabin, 1998).

An established body of findings, mostly based on cross-sectional studies, have documented that several significant factors are related to lower or higher rates of risky sexual behaviors among African American females (DiClemente et al., 2001; Grunbaum et al., 2002; Neblett, Davey-Rothwell, Chander, & Latkin, 2011). For instance, depression has been associated with higher rates of unsafe sex (Averett & Wang, 2012; Curry et al., 2012; Halfors et al., 2004; Hipwell, Stepp, Keenan, Chung, & Loeber, 2011). In contrast, having higher levels of STI/HIV prevention knowledge has been protective against having unsafe sex (Bachanas et al., 2002; Corby, Wolitski, Thornton-Johnson, & Tanner, 1991; St. Lawrence, 1993; Voisin, Tan, DiClemente, 2013). Without doubt, depression and STI knowledge, among other factors, are highly correlated with unsafe sex. However, most of what we know about risk and protective factors related to STI risk behaviors are derived from studies that have examined single risk or protective factors, which represent narrow conceptualizations of influence. These studies do not account for the actuality that individuals reside within multiple systems, which may simultaneously promote or restrain risky sex.

Therefore an ecological model provides a useful organizing framework for exploring how multiple factors across various systems may be related to risky sex among young African American females. In brief, this model proposes that human development takes place through progressively complex reciprocal interactions between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate environment (Bronfenbrenner, 1999). However, when we only examine single predictors to the exclusion of other important factors we do not obtain a realistic sense of the relative significance of potential predictors. Our examination of multiple risk and protective factors across a single population represents one of the significant contributions of this study.

In addition, the vast majority of what we know from HIV behavioral science is informed by cross-sectional studies. However, such designs are limited in their ability to disentangle important temporal ordering among variables, although they can establish important relationships prior to the mounting of expensive longitudinal studies to tease out temporal relationships. The prospective design of this inquiry represents another important contribution of this study.

Consequently, the primary aim of this study was to longitudinally examine how multiple risk factors (i.e., depression, sexual sensation seeking, risky peer norms) and protective factors (i.e., STI/HIV prevention knowledge, refusal to have sex self-efficacy, and social support) might be associated with risky sex when assessed simultaneously. In the following
sections we discuss the various risk and protective factors that are the focus of this study and the potential mechanisms that may account for their relationship to risky sexual behaviors.

1.1. Risk factors associated with increased sexual risk behaviors

Ample evidence indicates that psychosocial constructs such as depression (Hallfors et al., 2004; Morrill, Kasten, Urato, & Larson, 2001; Shrier, Harris, Sternberg, & Beardslee, 2001) sexual sensation seeking (Hendershot, Stoner, George, & Norris, 2007; Jones, 2004; Voisin, Tan, DiClemente, 2013), and peers norms endorsing risk behaviors (Bauermeister, Elkington, Brackis-Cott, Dolezal, & Mellins, 2009; Latkin, Kuramoto, Davey-Rothwell, & Tobin, 2010) are correlated with higher rates of unsafe sex among youth.

With regards to depression it is posited that individuals who are in distress may use sex as one way of self medicating difficult feelings (Elkington et al., 2010; Swanholm, Vosvick, & Chng, 2009). Consistent with this line of theorizing, during sexual intercourse significant mood elevating endorphins (e.g., oxytocin) are released into the blood stream which can create a sense of elevated well being (Meston, 2000). Additionally, using some drugs can release biologically active substances that affect the brain and automatic nervous system thereby reducing stress (Condra & Baum, 2010).

Another individual factor associated with risky sex is sexual sensation seeking (SSS). This is considered as a fondness for thrilling, optimal, and novel levels of sexual stimulation and arousal (Kalichman et al., 1994). Studies have shown that sexual sensation seeking is positively correlated with risky sex (Crawford et al., 2003; Dolezal, Meyer-Bahlburg, Remien, & Petkova, 1997; Kalichman, Heckman, & Kelly, 1996; Kalichman, Weinhardt, DiPonzo, Austin, & Webster, 2002; Lye Chng & Géliga-Vargas, 2000; McCoul & Haslam, 2001). Persons prone to SSS are often predisposed to adventure and frequently seek new and unusual sexual experiences. Consequently such persons may engage in unprotected sex with multiple partners as way of satisfying their need for stimulation and excitement (Boyle, Murray & Boekeloo, 2002; Reece, Dodge & Cole, 2002).

Finally on a peer level, a consistent body of literature provides evidence that negative peer norms are correlated with risky sex (Bauermeister et al., 2009; Latkin et al., 2010). Youth who belong to peer networks which endorse risky norms are more likely to themselves adhere to such norms (Latkin et al., 2010). Social learning (Bandura, 1994) and network theories (Friedman & Aral, 2001) supports such correlations. Given the modeling that occurs in such relationships and the reciprocal exchanges that are embedded within such strong networks, network members are more inclined to group norms and are susceptible to risky sexual behaviors (Metzler, Noell, Biglan, Ary, & Smolkowski, 1994).

1.2. Protective factors associated with deceased sexual risks behaviors

Sex by definition generally involves two persons, and a number of studies provide support that several relational dynamics are correlated with sexual behaviors. Gender power and male privilege in sexual relations would theoretically suggest that men hold more power than women during sexual negotiation (Wingood & DiClemente, 2002). Therefore, especially for females, having social support, possessing greater STI/HIV prevention knowledge, and being more confident in one’s ability to refuse sex without condoms (Sionean et al., 2002) have been shown to be correlated with lower rates of unsafe sexual practices.

For instance, on an individual level, several studies have shown that high STI/HIV prevention knowledge is protective against risky sex and contracting STIs (Bachanas et al., 2002; Corby et al., 1991; St. Lawrence, 1993; Voisin, Tan & DiClemente, 2013). According to one component of the Information Motivation Behavior (IMB) model, prevention
knowledge can have a direct impact on STI-related behaviors (Fisher, Fisher, & Harman, 2009). Several empirical studies support the IMB theoretical framework, and provide evidence for a protective relationship between prevention knowledge and reduced STI-related behavior (Fisher, Fisher, Bryan, & Misovich, 2002; Fisher, Williams, Fisher, & Malloy, 1999; Robertson, Stein, & Baird-Thomas, 2006).

Additionally, on an individual level, in order for young females to have full control over their sexual health it is important for them to have adequate self-efficacy to refuse unsafe sex (Bandura, 1990). Self-efficacy is defined as the self-perceived capability to say no to the enactment of specific behaviors (Bandura, 1977) and as it relates to sex, the ability to refuse intercourse especially if it involves high risk (Rosenthal et al., 1991). Consistent with this theorizing, several studies have provided evidence that females who have strong versus low refusal self-efficacy tend to report lower rates of risk sex and STIs (Ludwig & Pittman, 1999; Rosenthal et al., 1991; Seth, Raiji, DiClemente, Wingood, & Rose, 2009).

From a relational perspective, young females who have high levels of social support may be more inclined to negotiate safer sex compared to females who are isolated and lacking such social support (Albarracín, Kumkale, & Johnson, 2004; Pulerwitz, Amaro, Jong, Gortmaker, & Rudd, 2002). Therefore young females connected to networks where emotional and psychological needs are being met versus those detached from such supports, may be less inclined to submit to partner pressure to engage in high risk sex in anticipation of getting those emotional needs met (Pulerwitz et al., 2002).

In summary, few studies have examined multiple risk and protective factors across a single sample. In addition, few longitudinal studies have focused primarily on young African American females who bear some of the highest STI/HIV burdens. Consequently, the primary aim of this study was to longitudinally examine how a number of theoretically informed risk and protective factors might predict risky sex among African American adolescent females. The identification of such competing salient factors may be important to developing effective HIV prevention/intervention initiatives for this highly vulnerable population.

2. Methods

2.1. Sample and Procedure

From March 2002 to August 2004, African American adolescent females aged 15 to 21 years were recruited from three comparable STI clinics in downtown Atlanta, Georgia. These clinics were similar because they served similar demographics, were part of the same public health care system, had similar staffing patterns and were located in the city of Atlanta. Selection criteria for this study were participants who self-identified as African-American, were between the ages 15 to 21, reported vaginal intercourse in the past 60 days, were not married, currently pregnant, or attempting to get pregnant, and provided informed consent. If participants changed their intention to get pregnant between waves, this resulted in study exclusion. Of the eligible participants, 84.4% (N =715) enrolled in the study, completed baseline assessments and were randomized to study or control conditions that were part of an intervention study called HORIZONS. This intervention consisted of three components: (1) administering two 4-hour group STI/HIV prevention sessions, (2) providing vouchers to participants to give to their male sexual partners to facilitate STI screening/treatment and (3) administering four brief telephone booster sessions to reinforce group intervention content. Three hundred and forty eight participants (49%) were assigned to HIV intervention and 367 (51%) received enhanced standard of care intervention. There were no significant baseline differences in variables across study conditions, and study methods and interventions are described in greater detail elsewhere (DiClemente et al., 2009). Because
participants were part of a randomized control trial, randomization ensured that any potentially confounding participant characteristics were equally assigned to each study arm. Follow-up data was assessed at 6 and 12 months. The 12 month retention rate was 83%. Audio computer-assisted self-interview (ACASI) was used to assess all measures, which enhances data accuracy, increase participants’ comfort when answering sensitive questions and eliminates low literacy as a potential problem (Kissinger et al., 1999). Participants were compensated $25 for their study involvement. The Emory University Institutional Review Board approved all study protocols.

2.2. Measures

2.2.1. Risk factors—Depression was assessed based on eight items (Santor & Coyne, 1997) (e.g., I felt depressed; My sleep was restless). Participants responded to each question on a four point scale with “1 = less than 1 day” and “4 = 5–7 days”. Cronbach’s alpha was 0.89.

Sexual sensational seeking was assessed by a 9- item scale previously validated for African-American youth (DiClemente et al., 2010) (“I enjoy having sex on the spur of the moment,” “Having sex with a new partner is exciting to me.” [1=Strongly disagree, 4=Strongly Agree]. In this study, the Cronbach alpha for this scale was 0.72.

Risky peer norms were based on an established 8 item-scale that evaluates participant’s perception of their friends’ risky sexual practices (DiClemente RJ, 2009; Wingood & DiClemente, 2002) (e.g., How many of your friends do you think are having sex without condoms?) [1= None; 5= All]. Higher scores indicate greater perceived peer norms supporting risky sexual behavior. The Cronbach alpha for this scale was 0.68.

2.2.2. Protective factors—STD/HIV Prevention Knowledge variable was assessed using a pre-existing measure (DiClemente, 2009; Sikkema et al., 2000) comprised of 11 items that has been validated with African American females (e.g., if a man has an STD, he will have noticeable symptoms) [1=correct, 0=incorrect; Cronbach’s alpha=0.64].

Refusal to have sex self-efficacy was based on a previously validated 7-item scale (DiClemente RJ, 2009; Wingood & DiClemente, 2002) (e.g. How sure are you that you would be able to say no to having sex with someone you have known for a few days or less?) [1=I definitely can’t say no; 4=I definitely can say no]. The Cronbach alpha for this scale was 0.87.

Social Support was assessed using a pre-existing 8 item scale (Zimet, Dahlem, Zimet, & Farley, 1988) that measured different dimensions of family support (e.g., I can talk about my problems with my family), peer support (e.g., My friends really try to help me) and support from significant others (e.g., There is a special person in my life who cares about my feelings). [1=Strongly disagree, 4=Strongly Agree; Cronbach’s alpha=0.90].

2.2.3. Outcome variables—We assessed a number of sexual risk behaviors that have been implicated with higher risks for contracting STIs. These variables were assessed over a 60 day period in order to improve recall.

Sex under the influence of alcohol or drugs was assessed by one question “In the last 60 days, how many times did you have sex while high on alcohol or drugs?” For analysis this variable was dichotomized as ever (≥1 time) vs. never (0 times) having sex under the influence in the past 60 days.
Casual partners were assessed by the following question “In the past 60 days have you had casual sexual partners?” (yes/no).

Concurrent partners were assessed by the following question “In the past 60 days have you had sex with two or more partners at the same time?” (yes/no).

Number of vaginal sex partners in the past 60 days was assessed by one question “In the past 60 days, how many partners did you have vaginal sex with?” For multivariable analysis, number of vaginal sex partners was analyzed as ≥2 vs. 1 due to the high degree of skewness in the variable and the known association between multiple sex partners and HIV/STI risk.

Inconsistent condom use was assessed by the following questions: “In the past 60 days how many times did you have vaginal sex?”, and “Of the times you had vaginal sex in the past 60 days, how many times did you use a condom. Condom use was analyzed as a dichotomous variable: consistent (used a condom 100% of the time) vs. inconsistent (used a condom <100% of the time) among people who reported vaginal sex in the past 60 days.

2.3. Statistical Analysis

Exploratory analysis included chi-square tests for differences in proportions and Wilcoxon tests for comparing non-normally distributed continuous variables. We also calculated bivariate correlations between sexual risk behaviors and our predictor variables on a continuous scale. Continuous predictors were dichotomized at the median for multivariable analysis to aid in interpretability of the relative risk estimates. Results and conclusions were similar when we conducted the analysis with the continuous variables on their original scale. For multivariable analysis, we used generalized estimating equations (GEE) to adjust for correlation between repeated measurements on subjects over time. GEE regression models were used to evaluate the influence of relevant risk and protective factors on risky sex over the 6-month and 12-month follow-up for an “average” participant. The strength of GEE models lie in its ability to control for repeated within-subject measurements over the longitudinal course of the study. In this study, the use of GEE models allow us to take into account the 6 month and 12 month follow-up results for each participant in our analyses. Interpretation of GEE regression coefficients are similar to linear regression models (for continuous outcome variables) and logistic models (for categorical outcome variables). Log-binomial regression was used to calculate relative risks for sexual risk behaviors during the 12 month follow-up, controlling for age, intervention group assignment, time, and the baseline value of the outcome variable. For each of the sexual behavior outcomes, variables that were significant at p<0.10 in bivariate analysis were entered in multivariable regression models, with p<0.05 used as the cutoff for statistical significance in the final multivariable models. Age at baseline, intervention group, time, and the baseline value of the outcome was controlled for in all analyses. Data were analyzed in SAS version 9.2.

3. Results

This study was comprised of 715 African-American females aged 15–21 years. Their mean age at baseline was 17.8 (SD = 1.7). At baseline, mean depression score was 16.9 (range 8–32; SD=7.1), sexual sensation seeking was 17.5 (range 9–36; SD=3.9) and risky peers norms was 20.3 (Range 9 – 39; SD = 4.9). With regards to protective factors, mean STD/HIV prevention knowledge was 19.1 (range 12–22; SD=2.1), self-efficacy to refuse sex was 24.5 (range 7–28; SD=3.8) and social support was 35.0 (range 11–44; SD=6.5).

Overall risk behavior in the sample was high, though there were declines in risk behavior over time. In the 60 days prior to the baseline visit, 32% of participants reported sex under the influence of alcohol or drugs; 32% reported a casual partner; 5% reported concurrent sex
partners; 33% reported ≥ 2 partners for vaginal sex in the past 60 days; and nearly 75% of those who reported vaginal sex did not use condoms 100% of the time (See Table 1).

3.1. Sex under the influence of alcohol or drugs
In bivariate analyses, higher baseline levels of depression, sexual sensation seeking, and peer norms supporting risk behaviors were associated with increased risk of having sex under the influence of alcohol or other drugs during the 12 month follow-up. Factors that were related to reduced drug use during sex were higher levels of social support and refusal to have sex self-efficacy. In multivariable analysis, only peer norms supporting risk (aRR=1.47; 95% CI 1.18– 1.84) was associated with an increased risk of having sex while using alcohol or drugs during follow-up.

3.2. Casual partners
In bivariate analyses, higher sexual sensation seeking at baseline was associated with a greater risk of reporting casual sex partners during 12 month follow up. In addition, higher levels of refusal sex self-efficacy at baseline was negatively associated with reporting casual sexual partners at 12 month follow up. In multivariable analysis, only refusal to have sex self-efficacy was protective against having casual partners (aRR=0.63; 95% CI 0.50–0.80) (See Table 2).

3.3. Concurrent partners
In bivariate analyses, refusal to have sex self-efficacy was associated with decreased risk of sexual concurrency during the 12 month follow-up. In multivariable analysis, refusal to have sex self-efficacy (aRR=0.39; 95% CI 0.18–0.86) remained associated with a lower risk of reporting concurrent partners during the 12 month follow up.

3.4. Number of vaginal sex partners
In bivariate analyses, higher levels of sexual sensation seeking and peer norms supporting risk behaviors were associated with increased risk of having 2 or more vaginal sex partners during the 12 month follow-up (Table 2). In addition, higher levels of sex refusal self-efficacy was protective against having a high number of sex partners during a follow-up. In multivariate analyses, when controlling for potential confounders, higher sexual sensation seeking (aRR=1.36; 95% CI 1.08–1.71) was predictive of having a high number of sex partners, and sex refusal sex self-efficacy remained protective against such risk behaviors (aRR=0.73; 95% CI 0.58–0.92).

3.5. Inconsistent condom use
The only factor associated with inconsistent condom use in bivariate and multivariable analyses was higher sexual sensation seeking (aRR=1.11; 95% CI 1.00–1.22).

4. Discussion
Few longitudinal studies have examined multiple risk and protective factors related to unsafe sexual behaviors among young African American females, who in the U.S. have some of the highest rates of STIs/HIV. Major findings indicated that when risk factors were collectively considered, higher levels of sexual sensation seeking was predictive of having sex while high on alcohol and other drugs and having a greater number of vaginal sexual partners. In addition, having peers who endorsed risky norms was predictive of participants having sex under the influence of alcohol and drugs. Prior findings have indicated that SSS is associated with risky sex (Crawford et al., 2003; Dolezal, Meyer-Bahlburg, Remien, & Petkova, 1997; Kalichman, Heckman, & Kelly, 1996; Kalichman, Weinhardt, DiFonzo,
Austin, & Webster, 2002; Lye Chng & Géliga-Vargas, 2000; McCoul & Haslam, 2001). However, these studies did not examine this construct in conjunction with other potential predictors such as depression and peer norms. Other studies have also documented that depression is associated with substance use during sex (Hallfors et al., 2004; Hipwell, Stepp, Keenan, Chung, & Loeber, 2011). However, such studies did not assess SSS. It is highly possible that SSS may actually be driving risky sex but was an unmeasured construct in earlier studies which may have overestimated the effects of depression and peer norms. Our findings also documented that belonging to peer networks that endorsed negative norms was associated with unsafe sex, independent of SSS. This finding may reflect the developmental life stage of many young African American females as peer influences tend to be important considerations in their decisions to participate in risk behaviors (Bauermeister, Elkington, Brackis-Cott, Dolezal, & Mellins, 2009; Latkin, Kuramoto, Davey-Rothwell, & Tobin, 2010).

Additionally, our findings also documented that high SSS was predictive of having multiple vaginal sexual partners and inconsistent condom use. Prior studies have corroborated this relationship between SSS and a high number of sexual partners (Reece, Dodge & Cole, 2002), although mostly among men who have sex with men (MSM) (Kalichman et al., 1994; Kalichman et al., 2002; McCoul & Haslam, 2001; Crawford et al., 2003; Dolezal et al., 1997). In addition, our finding documented that SSS was predictive of inconsistent condom use. Having sex without consistently using condoms may not only heighten sexual sensation during intercourse but this may also heighten a sense of danger and risk which may be gratifying for persons who are predisposed to SSS. Given that sexual sensation was a significant and consistent predictor of sexual risk behaviors among this population, intervention approaches need to recognize this as a legitimate need for some participants and provide them with sexual harm reduction practices that may minimize their risk for contracting STIs. These may include making condom use more erotic and exciting. Other measures may include limiting drug and alcohol use during sexual encounters or helping females make it a practice of asking casual sexual patterns their STI/HIV histories, prior to engaging in sex.

While SSS may account for more frequent past sexual activities (i.e., higher number of lifetime sexual partners) and unsafe practices (i.e., inconsistent condom use) that may put them at risk of an infection, our findings suggest that even in the context of their sexual urges to sensation seek, young African American females may be protected against STIs through enhancing their abilities to say no to casual and concurrent sex.

With regards to protective factors, our findings indicate that having high self efficacy to refuse sex was associated with having fewer vaginal sexual partners, and was negatively associated with having casual sexual partners; and having concurrent sexual partners. Higher sex refusal self efficacy was also protective against having sex under the influence of alcohol or drugs in bivariate analysis, although this association was not statistically significant in multivariable analysis. Negotiating safer sex is a complex process and these findings suggest that young females who express self efficacy to refuse sex report a consistent pattern of lower drug and sexual risk behaviors. Social support was not found to be a protective factor and our overall findings suggest that African American adolescent females may benefit from efforts designed to instill and enhance individual social skills on how to refuse unwanted sex. For example using peer group social education models and teaching young females how to exercise self efficacy in non-sexual situations that can then be transferred sexual situations, might be one approach to developing such capacities in young females (Wingood & DiClemente, 2006). Another approach might involve teaching African American adolescent females how to enter into safer sex discussions with their male partners followed by guided practice sessions based on role plays. Therefore, intervention
practice sessions can mirror general refusal to have sex, especially in the presence of risk queues such as drugs or a partner refusing to use condoms. The collective experience of the group members to strengthen and fortify sex refusal self efficacy may enable participants to apply newly acquired skills in their current sexual relationships (Jemmott, Jemmott, Fong, 1998).

4.1. Limitations

Although these findings are significant there are study limitations which warrant mentioning. These findings are limited by the validity of the self-reported measures. Also, the study was based on a sample of African American adolescent female residing in the urban South. Therefore, the findings may not apply to other African American adolescent females or adolescent females from other racial/ethnic groups or different socioeconomic strata. Further research is needed with diverse adolescent populations that address these limitations. In this study, although we assessed a wide array of risk and protective factors, this list was not exhaustive and we did not asses sexual cohesion and partner status which have been shown to be significant correlates of sexual behaviors among female adolescents (DiClemente et al., 2009). Therefore future studies would also need to account for these factors. Finally, in this study, we investigated important risk and protective factors associated with STI-risk behaviors longitudinally, and included multiple measures that are rarely assessed across a single population. These advantages offset the fact that these data were collected several years ago.

4.2. Conclusion

Several effective HIV/STD prevention programs have been developed specifically for African American adolescent females (DiClemente & Crosby, Jemmott, Jemmott Fong, 1998: Jemmott et al., 2005). These universally share the principle that relational dynamics are a cornerstone of fostering safer sex behaviors for this population. Findings from this study suggest that one particular form of relational dynamics, namely refusal to have sex self efficacy may be an especially beneficial focal point for intervention efforts that seek to foster reduced drug and sexual risk behaviors. In addition, these findings suggest that the concept of SSS cannot be ignored when designing prevention programs.

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Highlights

Over a 12 month follow-up, nearly a third of women reported unsafe sex.
Higher levels of sexual sensation seeking were associated with unsafe sex.
Higher sex refusal self-efficacy was protective against unsafe sex.
Table 1
Characteristics of the sample at baseline, 6, and 12-month follow-up

<table>
<thead>
<tr>
<th></th>
<th>Baseline, N=715</th>
<th>6-month, N=612</th>
<th>12-month, N=605</th>
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<tbody>
<tr>
<td>Demographics</td>
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<tr>
<td>Age</td>
<td>17.8 (1.7)</td>
<td>18.3 (1.8)</td>
<td>18.8 (1.7)</td>
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<td>Psychosocial risk variables</td>
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<tr>
<td>Depression</td>
<td>16.9 (7.1)</td>
<td>14.8 (7.2)</td>
<td>14.5 (7.1)</td>
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<td>Sexual sensation seeking</td>
<td>17.5 (3.9)</td>
<td>16.9 (4.0)</td>
<td>17.1 (4.5)</td>
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<td>Peer norms supporting risk</td>
<td>20.3 (4.9)</td>
<td>19.9 (5.1)</td>
<td>20.4 (5.0)</td>
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<tr>
<td>Psychosocial protective variables</td>
<td></td>
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<td></td>
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<tr>
<td>STD/HIV prevention knowledge</td>
<td>19.1 (2.1)</td>
<td>18.1 (1.8)</td>
<td>20.0 (1.8)</td>
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<td>Refusal sex self efficacy</td>
<td>24.5 (3.8)</td>
<td>25.2 (3.8)</td>
<td>25.4 (4.0)</td>
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<td>Social support</td>
<td>35.0 (6.5)</td>
<td>35.4 (6.7)</td>
<td>35.7 (6.8)</td>
</tr>
<tr>
<td>Sexual behaviors (in past 60 days)</td>
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<td></td>
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<tr>
<td>Sex under the influence of alcohol or substances</td>
<td>229 (32.1)</td>
<td>152 (24.8)</td>
<td>144 (23.8)</td>
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<td>Casual sex partner</td>
<td>225 (31.5)</td>
<td>155 (25.3)</td>
<td>154 (25.5)</td>
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<tr>
<td>Concurrent partners</td>
<td>35 (4.9)</td>
<td>21 (3.4)</td>
<td>16 (2.6)</td>
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<td>≥2 partners for vaginal sex</td>
<td>235 (33.0)</td>
<td>159 (26.0)</td>
<td>137 (22.6)</td>
</tr>
<tr>
<td>Inconsistent condom use</td>
<td>460 (74.8)</td>
<td>354 (68.9)</td>
<td>317 (64.6)</td>
</tr>
</tbody>
</table>
### Table 2

GEE Analysis of Factors Associated with Risk Behaviors During 12-month Follow-up

<table>
<thead>
<tr>
<th>Factor</th>
<th>≥2 partners for vaginal sex</th>
<th>Sex while drunk or high</th>
<th>Inconsistent condom use</th>
<th>Casual sex partner</th>
<th>Concurrent sex partners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (95% CI)</td>
<td>aRR (95% CI)</td>
<td>RR (95% CI)</td>
<td>aRR (95% CI)</td>
<td>RR (95% CI)</td>
</tr>
<tr>
<td>Depression (High vs. Low)</td>
<td>1.15 (0.93–1.41)</td>
<td>-</td>
<td>1.30 (1.07–1.59) **</td>
<td>1.13 (0.93–1.37)</td>
<td>1.06 (0.97–1.16)</td>
</tr>
<tr>
<td></td>
<td>1.16 (0.99–1.36)</td>
<td>1.30 (1.07–1.59) **</td>
<td>1.13 (0.93–1.37)</td>
<td>1.06 (0.97–1.16)</td>
<td>-</td>
</tr>
<tr>
<td>Sexual sensation seeking (High vs. Low)</td>
<td>1.20 (1.20–1.86) **</td>
<td>1.36 (1.08–1.71) **</td>
<td>1.26 (1.02–1.55) **</td>
<td>1.10 (0.91–1.33)</td>
<td>1.11 (1.00–1.22) **</td>
</tr>
<tr>
<td>Peer norms supporting risk (High vs. Low)</td>
<td>1.06 (1.06–1.64) *</td>
<td>1.19 (0.95–1.49)</td>
<td>1.63 (1.30–2.04) **</td>
<td>1.47 (1.18–1.84) **</td>
<td>1.09 (0.99–1.19) †</td>
</tr>
<tr>
<td>STD/HIV prevention knowledge (High vs. Low)</td>
<td>0.83 (0.66–1.05)</td>
<td>-</td>
<td>1.19 (0.97–1.45) †</td>
<td>1.11 (0.92–1.34)</td>
<td>1.02 (0.92–1.12)</td>
</tr>
<tr>
<td>Refusal sex self efficacy (High vs. Low)</td>
<td>0.53 (0.53–0.83) **</td>
<td>0.73 (0.58–0.92) **</td>
<td>0.77 (0.63–0.96) †</td>
<td>0.90 (0.74–1.11)</td>
<td>0.93 (0.85–1.02)</td>
</tr>
<tr>
<td>Social support (High vs. Low)</td>
<td>0.83 (0.76–1.15)</td>
<td>-</td>
<td>0.75 (0.60–0.92) †</td>
<td>0.84 (0.68–1.04)</td>
<td>1.00 (0.91–1.09)</td>
</tr>
</tbody>
</table>

***All analyses controlled for age at baseline, intervention group, time, and the baseline value of the outcome; Timeframe for all outcomes is past 60 days

† p<0.10;

* p<0.05;

** p<0.01