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Relationships Among Substance Use, Multiple Sexual Partners, and Condomless Sex: Differences Between Male and Female U.S. High School Adolescents

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Abstract

Male and female students have different behaviors in condomless sex. This study examined the differences in risk factors for condomless sex between male and female high school students. This cross-sectional, exploratory, correlational study analyzed secondary data from 4,968 sexually active males and females participating in the 2011 National Youth Risk Behavior Survey. Results in descriptive statistics and multivariate binary logistic regressions showed that condomless sex was reported as 39.70% in general. A greater proportion of females engaged in condomless sex (23.26%) than did males (16.44%). Physical abuse by sex partners is a common reason to fail to use condoms regardless of gender. Lower condom use was found in (1) those experiencing forced sex by a partner in males, (2) female smokers, and (3) female with multiple sex partners. Thus, sexual health education may emphasize the different risk factors and consider gender characteristics to reduce condomless sex.

Keywords: sex; adolescent health; condomless sex; substance use; intimate partner violence

Sexually active adolescents in the United States (U.S.) have a high degree of exposure to unintentional health risks. Negative health outcomes affect more than one third (33.7%) of sexually active students and about half (47.4%) of high-school students who have experienced sexual intercourse (Centers for Disease Control and Prevention [CDC], 2012a). In the U.S., the CDC reported that 1 in 4 adolescents acquire a sexually transmitted disease (STD) each year (2014). The age group 15–24 years accounted for 25.7% of new human immunodeficiency virus (HIV) infections (CDC, 2013). In addition, U.S. youth aged 12–19 years have higher rates of pregnancy compared to those in other developed and developing countries (Kearney & Levine, 2012).

Female students have unique experiences regarding sexual activity and its consequences. Females are at greater risk than males for acquiring STDs during condomless sex because of their unique biological vulnerabilities (Reis Machado et al., 2014). Condomless sex contributes to higher HIV and other STD infection rates in female adolescents (27.2% and 78.2% for HIV and STD infection, respectively) than in male adolescents (17.6% and 21.7% for HIV and STD infection, respectively) aged between 13 and 19 years (CDC, 2013; Salerno, Darling-Fisher, Hawkins, & Fraker, 2013). Adolescent pregnancy also is a significant concern for female adolescents because it is associated with high school dropout, inadequate prenatal care, premature birth, and child abuse (Kearney & Levine, 2012).

To prevent these negative outcomes, researchers, clinicians, and parents focus on risky sexual behavior. The theoretical definition of risky sexual behavior is engaging various risk-taking behaviors related to other negative consequences during the sexual intercourse (Simons, Sutton, Simons, Gibbons, & Murry, 2016). A comprehensive study integrating six competing theories on adolescent's risky sexual behavior operationalized risky sexual behavior

using the number of sexual partner change and rates of condom use at sexual intercourses (Simons et al., 2016). However, preventing risky sexual behaviors and consequences is challenging because multiple risk factors affect sexually activity simultaneously, such as proper use of condom at each intercourse. This study focuses on the relationships among condomless sex and other risky sexual behaviors specifically multiple sexual partners, intimate partner violence (IPV), and substance use.

Proper and consistent condom use is the first prevention method for reducing the risks of many negative consequences of unprotected sex (CDC, nd). However, adolescents still fail to use condoms as recommended; only 49% of adolescent females and 64-66% of males reported condom use with each intercourse (Martinez, Copen, & Abma, 2011). One possible reason for the differences in condom use between male and female adolescents is that female adolescents tend to have less power in the decision to use condoms during sexual intercourse. Female adolescents often feel powerless when negotiating condom use with their partners during sexual intercourse (Lee, Cintron, & Kocher, 2014; Teitelman, Tennille, Bohinski, Jemmott, & Jemmott, 2011). This power issue also influences how age disparity between sexual partners significantly influences on engaging in risky sexual behaviors. Female adolescents are even less likely to use a condom when their sexual partners are older than they are (Morrison-Beedy, Xia, & Passmore, 2013; Staras, Livingston, Maldonado-Molina, & Komro, 2013). Research explained that adolescent girls with older partners are less willing to discuss condom use with their partners compared to those with similar-aged partners because they do not have competent to initiate discussion or decisions (Morrison et al., 2013).

Another challenge of adolescents' risky behavior is having multiple numbers of sexual partners or frequent changes, which is associated with condom use. More than 16% of female adolescents in the U.S. aged between 15 and 19 years have had multiple sexual partners (Martinez et al., 2011). STD and HIV infections among female adolescents with multiple sex partners in their lifetimes is 3 times higher than those with one lifetime sexual partner because of the failure to use condoms during intercourse (Forhan et al., 2009). A previous study using the data of the 1992 National Youth Risk Behavior Survey (YRBS) found sexually active females and males reported different patterns of condom use when they had multiple sex partners (Santelli, Robin, Brener, & Lowry, 2001). Although males did not report any relationship between the number of sexual partners and condom use at last intercourse, female adolescents with multiple sex partners reported significantly lower use of a condom during their last instance of intercourse compared to those with a single partner (Santelli et al., 2001).

Intimate partner violence (IPV) has also been found to be related to condomless sex in both male and female adolescents. In a study among adolescents with diverse ethnic backgrounds, researchers found that White adolescents who had experienced dating violence tended to have decreased condom use while Hispanic adolescents with history of forced sex were also less likely to use condom during last intercourse (Alleyne, Coleman-Cowger, Crown, Gibbons, & Vines, 2011). More adolescent girls have experienced IPV than adolescent boys (Alleyne et al., 2011; Russell et al., 2014). Among adolescent females, having a history of IPV is significantly associated with increased condomless sex, including forced sex without a condom (Fontenot, Fantasia, Lee-St, & Sutherland, 2014; Silverman et al., 2011; Teitelman et al., 2011). For male adolescents, there is few research conducted to examine the relationships among condomless sex, IPV and forced sex. The limited evidence is available to support that males who have experiences forced sex also are more likely to have condomless sex. For example, a study of 446 male university students found that 20% of participants reported the experience of forced sex since age 14. Co-occurrence of IPV and coerced condomless sex were highly reported among male students with forced sex experiences (Lehrer, Lehrer, & Koss, 2013).

Moreover, lower levels of condom use were reported in adolescents or young adults affected by diverse types of substance use in their lifetimes (Lee et al., 2014). Research shows that substance use such as cigarette smoking, alcohol drinking, solvents and illicit drug use and sexual intercourse are highly prevalent and significantly clustered behaviors in adolescents (Di Bona, & Erausquin, 2014; McAloney, 2015). Substance use, especially hard drug use, was significantly associated with condomless sex in adolescents (Tucker et al., 2011). Alcohol use was associated with condomless sex, multiple sexual partners, and partner violence (Baskin-Sommers & Sommers, 2005). Failure to use a condom due to substance use may be understood as an outcome of impaired judgment inhibiting safe sexual intercourse (Santelli et al., 2001; Santelli et al., 2009). However, there is limited evidence, thus a updated study is required to improve practices and policies to reflect the current prevalence of substance use among adolescents because substance use has become more prevalent and diverse (Dunn et al, 2008; Howard & Wang, 2004b; Salemo et al., 2013).

Given the impact of condomless sex on sexual health, it is necessary to understand comprehensive investigation of multiple risky sexual behaviors including multiple sex partners, IPV, substance use, and condomless sex. Most of the previous research examined each relationship among multiple factors and condomless sex separately. Since diverse types of risky sexual behaviors seem to be interdependent each other, comprehensive and theory-based study is required to understand this complex phenomenon. To examine difference between male and female high school adolescents, using data from national sample overcomes limited generalizability which most of previous studies had due to use of convenience and/or small samples (Kirby & Barry, 2012; Daniels et al., 2014). In addition, specific types of substance use have been rarely investigated in relation to condom use in previous studies in general (Dunn et al., 2008; Howard & Wang, 2004b; Salerno et al., 2013). This study aims to provide foundational information about the differences in condomless sex between male and female adolescents affected by multiple sex partners and substance use based on theory of triadic influence.

Conceptual Framework

The theory of triadic influence has been used to explain that an individual's behavior is simultaneously affected by his or her current social situation, general cultural environment, and intrapersonal characteristics (Flay & Petraitis, 1994). According to the theory of triadic influence, intrapersonal characteristics such as age, gender, race, and sense of self may affect one's health-related behaviors. The social-cultural environment in which a behavior is valued or perceived may affect the attitude of a person in the environment toward the behavior, thus affecting his or her behavior choices. Social situations such as peer relationships may also affect an individual's behaviors (Flay & Petraitis, 1994).

Adolescent sexual risk behavior is considered to be determined by a complex combination of personal, social, and environmental factors (Santelli et al., 2009; Donovan & Jessor, 1985). This theory-driven analysis using the theory of triadic influence examined personal characteristics, social situations, and cultural environment that influence sexual behavior. Personal characteristics such as age, race, and ethnicity as well as socio-cultural and environmental factors such as acceptance of substance use in high school environment and social situation factors (e.g., multiple sexual partners, physical abuse, and forced sex) were factors considered to influence the behavior of having condomless sex (see Figure 1).

This study aimed to identify gender differences in the associations of condomless sex among adolescent students related to substance use and multiple sexual partners. The findings can guide sexual health promotion and education within the school setting to support both adolescents and primary care providers in addressing the complex sexual health needs of adolescents. Our research questions were:

1. How are substance use and the number of sexual partners associated with condomless sex at the last intercourse comparing male and female high school students?
2. How do demographic characteristics, intimate partner violence in relationships with sexual partners, and substance use differ between male and female high school students who are sexually active?

Methods

This study is cross-sectional and correlational in design, using secondary data obtained from the 2011 National Youth Risk Behavior Survey (YRBS) (CDC, 2011). For this secondary data analysis study, the exempt status was obtained through the Human Subject Committee review at the affiliated university based on the use of de-identified data. In the primary data collection of YRBS, participation was anonymous and voluntary. The Institutional Review Board at the CDC reviewed and approved the national YRBS protocol. There was no direct relationship between the investigators of this secondary data analysis and study participants.

Description of Primary Data: National Youth Risk Behavior Survey Data

The 2011 National YRBS used three-stage cluster sampling to obtain a nationally representative sample of high school students in grades 9 to 12, including public, private, and Catholic schools in all 50 states in the U.S. and the District of Columbia (CDC, 2012a). The first-stage sampling consisted of 1276 counties, while the second-stage sampling included 194 schools randomly selected with proportionate selection depending on the school's enrollment size. In the third stage of sampling, 1-2 whole classes from each chosen school were randomly selected. Of the 194 sampled schools, 158 schools participated in the survey (81%). The questionnaire was completed by 15,503 students, with a

response rate of 87% and 78 cases excluded due to quality control failure (CDC, 2012a). The YRBS data were collected for 16 months from September 2010 through December 2011 using a self-administered, paper-and-pencil based questionnaire that included 86 questions. Questions covered a broad range of health-related behaviors, including substance use and sexual activities, as well as demographic data (CDC, 2012a). The YRBS data collection methodologies have good validity and reliability (Brener et al., 2002).

Participants

The secondary data analysis included 4,968 high school students who had been sexually active in the past 3 months with at least one or more sexual partner(s). Eligible students were enrolled in grades 9 to 12 of high school. Excluded students were those who (1) did not report their gender; (2) did not have sexual intercourse during the previous 3 months; (3) reported “ungraded or other grade” or no grade; and (4) did not report on condom use at the last instance of sexual intercourse (see Figure 2).

Instruments

Dependent Variable. Condomless sex was the dependent variable of this secondary data analysis. Based on the CDC’s definition, condomless sex was identified using the following question: “The last time you had sexual intercourse, did you or your partner use a condom?” (CDC, 2011). Response categories were (1) used a condom at the last instance of sexual intercourse as a referent group; and (2) did not use a condom at the last instance coded as 1.

Independent Variables and Controls. Gender was a main independent variable. YRBS interviewees reported self-recognized gender as either male or female. Self-reported numbers of sexual partners within the previous 3 months was another independent variable ranging from 1 to 6. Self-reported sexual behaviors, including the number of sexual partners in the last 3 months, have good criterion-related validity (Orr, Fortenberry, & Blythe, 1997).

Recent substance use included cigarette smoking, alcohol drinking, marijuana use, and cocaine use during the past 30 days. Considering the wide range of psychoactive substance misuse (World Health Organization, 2014), we selected alcohol, tobacco, marijuana, and cocaine in this study because of their high prevalence among adolescents and their potential impact on health promoting behaviors (Di Bona, & Erausquin, 2014). The validity of self-reporting of cigarette smoking, alcohol use, and drug use by adolescents has been established in previous studies (Stacy, Widaman, Hays, & DiMatteo, 1985; Wilcox, Bogenschutz, Nakazawa, & Woody, 2013; Wills & Cleary, 1997; Winters, Stinchfield, Henly, & Schwartz, 1991). As control variables, intimate partner violence was measured by having the experience of physical abuse or forced sex by partners. Both variables were categorical and referent groups were those who did not experience physical abuse or forced sex from their partners.

Demographic variables, including age, race, and ethnicity, were included as control variables. Age was a continuous variable ranging from ≤ 12 to 18. Race and ethnicity was a categorical variable including non-Hispanic White as the referent group, Hispanic, non-Hispanic African American, and non-Hispanic Asian or other. Table 1 shows detailed information for each question to measure and operationalize the independent and control variables.

Procedures

Data acquisition, screening, and preparation. The 2011 YRBS data were downloaded from the CDC website (CDC, 2011). Two investigators checked the quality and completeness of the dataset during the data cleaning. We checked all systemic missing data and recoded selected variables considering the logical consistency related to condomless sex.

We did not impute values for missing data. Among the 4,968 students sampled, the regression analysis revealed 1,040 missing cases across all selected study variables in the logistic regression model. This represented 20.9% of the total and the missing values were not missing at random. The majority of missing cases were for reports of substance abuse. We decided not to impute the data because (1) there were unique characteristics of non-reporters of substance use data in previous literature (Richardson, Fendrich, & Johnson, 2003; Riou França, Dautzenberg, Falissard, & Reynaud, 2009; Stockwell, Zhao, & Macdonald, 2014); and (2) three variables were dichotomous, meaning that simple imputation using means or medians was not appropriate.

To account for the complex sample design of the survey, we conducted all analyses of the weighted data using an add-on of IBM SPSS Complex Samples (IBM, 2012). The weighted dataset was generated specifying the “stratum” variable as a stratification variable, the “psu” variable as a cluster variable, and the “weight” variable as the sample weight variable. The weighting factors enabled us to adjust for nonresponse and oversampling of racial and ethnic minorities including African American, Hispanic, Asian, and others and to have a sufficient sample size for a logistic regression model with 11 independent variables, using a significance level (alpha) of .05, an odds ratio of 1.3, and a power of 0.80, as calculated by G*Power (Faul, Erdfelder, Lang, & Buchner, 2007).

No concern of multicollinearity existed among the 11 independent variables, based on correlation coefficients from bivariate correlations and the results of multicollinearity diagnostic tests, including tolerance values, variance inflation factor values, condition indices, and the Durban–Watson statistic.

Data Analysis

All statistical analyses were performed using SPSS version 22.0 using the add-on module of IBM SPSS Complex Samples with the significance level set at 0.05 (two-tailed). To examine research question 1, we used binary logistic regression models, controlling demographic characteristics, intimate partner violence, and substance use, to examine differences between male and female high school students in the odds of failure to use condoms at the last sexual intercourse. To examine research question 2, descriptive analyses (independent t and chi-square tests) were conducted to compare male and female adolescents’ demographic characteristics, experiences of intimate partner violence, and substance use.

Results

Description of Sample

The characteristics of high school students who were sexually active are shown in Table 2. Both males and females were approximately equally represented (49.90% male and 50.10% female). Grades represented were 9, 10, 11, and 12 (17.04%, 22.95%, 27.80%, and 32.30%, respectively), with significantly higher grades in females compared to males ($p = 0.03$). Non-Hispanic White accounted for the majority (56.29%) in general. Female students were more likely to be non-Hispanic White, while male students were racial and ethnic minorities ($p < 0.001$).

On average, the participants had their first experience of sexual intercourse when they were 14.43 years old ($SE = .04$). The average number of sexual partners in the prior 3 months was 1.62 ($SE = .04$). Among almost 40% of high school students reporting condomless sex, female students reported significantly more condomless sex (23.26%) than did male students (16.44%; $p < 0.01$). Overall, 17.42% of high school students reported physical abuse by their partners, without any gender difference between the groups. Overall, 15.73% of participants experienced forced sex by their partners. Female students (11.42%) were more likely to have experienced forced sex than male students (4.31%; $p < 0.01$). Alcohol was the most prevalent substance used (62.41%), followed by marijuana (43.10%), cigarettes (34.74%), and cocaine (6.52%). The substance use differed between males and females, and males reported higher levels of all substance uses. Male students used cocaine (4.51%) twice as often as female students did (2.01%).

Male and Female Differences in Multivariate Factors of Condomless Sex Group

Table 3 shows the results of the binary logistic regression analysis stratified by gender. Significant factors affecting the use of a condom at the last sexual intercourse in general included: a) being non-Hispanic African American; b) experience of physical abuse by sex partners; c) experience of forced sex by partners; d) smoking; and e) having multiple sex partners. Experience of physical abuse by sex partners was a significant factor of condomless sex in both male and female groups. For condomless sex, the adjusted odds of experiencing physical abuse from a sex partner were lower in female students than in male students (aOR = 1.56, 95% CI: 1.17, 2.09 for females; and aOR = 1.76, 95% CI: 1.26, 2.45 for males).

In male students, being a non-Hispanic African American and experiencing physical abuse from a sex partner were significant factors. For condomless sex, the adjusted odds were significantly lower for non-Hispanic African American male students than their non-Hispanic white peers (aOR = 0.61; 95% CI: .42, .89). The adjusted odds of experiencing forced sex by a partner were 2.53 (95% CI: 1.61, 3.98). However, those two factors were not statistically

significant in the female group (aOR = 1.17; 95% CI: .83, 1.65 and aOR = 1.25; 95% CI: .91, 1.73). In contrast, smoking and multiple sex partners were significant factors for condomless sex among females. The adjusted odds of smoking were 1.55 (95% CI: 1.18, 2.05), while the adjusted odds of multiple sex partners were 1.15 (95% CI: 1.01, 1.31). However, those two factors were not statistically significant among males (aOR = 1.07; 95% CI: .79, 1.43 and aOR = 1.08; 95% CI: .96, 1.19).

Discussion

In general, about 40% of high school students reported not using condom with each intercourse as similar to prevalence report (Martinez et al., 2011). Our findings confirmed significant gender differences in condomless sex. Female students had more condomless sex compared to male students, as consistent with the report of Martinez et al (2011). It has been understood that female adolescents often have less power in sexual relationships; therefore, they may not be able to decline their partner's decision to have condomless sex (Buzi et al., 2003; Teitelman et al., 2011). This tendency was significantly identified among African American students. Our study found that African American male students used condoms during sexual intercourse; however African American females did not. The result is consistent that African American women are less likely to use a contraceptive method efficiently or do not use contraception at all compared to their White counterparts (Dehlendorf et al., 2014).

Based on the theory of triadic influence (Flay & Petraitis, 1994), the relationship with sexual partner based on individuals' social expectation affects the individual's behavior, that is the use condom at the sexual intercourse in this study. A recent literature review (Lee, 2014) examining 18 African American studies of risky sexual behaviors, unique culture dynamic in African American males increase self-esteem, which enables them to be more sexually active than females representing early debut or multiple sex partners. In sexual relationship, they expect that they have to "control their partners" or "must have sex (Lee et al., 2014, p 214)." In sequence, African American adolescent females are less likely to use condoms under the control the male partners. Findings from another exploratory study of 64 adolescent African American females are consistent to our understanding. Coerced condom avoidance, through physical abuse and/or threats, emotional manipulation, and condoms sabotage, was common when the female partner wanted to use a condom and the male partner did not. Thus, power differential in heterosexual relationships may negatively impact African American females' ability to decide or negotiate for safe sexual practices (Teitelman et al., 2011).

Our study findings have added further understanding beyond power differentials between males and females. In our study, physical abuse by a sex partner was associated with failure to use condoms at sexual intercourse regardless of gender. In general, there are strong evidences established to suggest that females are more likely to experience IPV and forced sex (Alleyne et al., 2011; Fontenot et al., 2014; Silverman et al., 2011; Teitelman et al., 2011). Living in areas with high rates of partner abuse seems to affect their vulnerability. A previous study among adolescent females living in poor urban areas with high rates of HIV and partner abuse found that over 50% of participants also reported unwanted, unprotected sex. Those who had a history of physical and/or sexual violence were even more likely to have experienced forced, condomless sex among (Teitelman et al., 2011).

It is great addition in this area because of our significant finding of the relationship between sexual abuse and condomless sex in males. Our male participants seem to be more vulnerable to condomless sex resulting from intimate partner violence because they experienced physical abuse or forced sex by the sex partner simultaneously. Although the prevalence of IPV is lower than the gender counterpart, its impact on risky sexual behavior is stronger to make them more vulnerable than those without IPV (Smith & Ford, 2010). This finding is consistent with the previous studies, which showed that physical abuse and forced sex were significantly associated with condomless sex among male adolescents (Homma, Wang, Saewyc, & Kishor, 2012) and college students with history of IPV (Lehrer et al., 2013). Using the theory of planned behavior, researchers found that normative beliefs, including approval from sexual partner, significantly influenced adolescents' decisions to use condoms (Villaruel, Jemmott, Jemmott, & Ronis, 2004). Similar to African American females, males with IPV have vulnerable position to initiate discussion for or decide proper condom use at sexual intercourse with their abusive partners.

Different types of substance use affected male and female students' condom practices in our study. The use of tobacco was significantly associated with condomless sex for females during their last experiences of sexual intercourse but not for males. Moreover, no other substance use—including alcohol, cocaine, and marijuana—were significant factors associated with failure to use condoms during sexual intercourse among females. Tobacco use often co-occurs with

engagement in other risky behaviors in females, including substance use and risky sexual behavior (Camenga, Klein, & Roy, 2006). Similar to our study, Camenga and colleagues (2006) found that female smokers were significantly more likely to have sex without a condom compared to non-smoking females. Because cigarette smoking is considered as a gateway drug leading to risky behaviors, such as other illicit substance use (Lai, Lai, Page, & McCoy, 2000), education on smoking cessation may be expected to have secondary benefit to prevent condomless sex specifically in adolescent females (Aras, Semin, Gunay, Orcin, & Ozen, 2007). Interestingly, our study findings confirmed that alcohol drinking was not associated with condomless sex; a 15-year descriptive trend analysis also had similar findings (Anderson & Mueller, 2008). Traditionally, failure to use condoms has been considered as a result of impaired judgment that inhibits safe sexual intercourse among substance users (Santelli et al., 2001; Santelli et al., 2009). Interestingly, our findings did not support the hypothesis that alcohol drinker had poor judgment increasing failure to use condom properly at sexual intercourse. The theory of triadic influence (Flay & Petraitis, 1994) helps us to understand mismatch between conceptual hypothesis and data. Substance use could be influenced by sociocultural and environment factors primarily rather than individual or dyadic relationships. The theory explains that sociocultural and environmental factors affect one's attitude toward a behavior and further influence the behavior choice. An empirical study conducted by Ennett and colleagues (2006) support this position. Their study findings described how peer context of substance use influences adolescents through a social network analysis. Adolescents in close social proximity to friends and peers who used substances, those who were less embedded in a social network, and those who had greater social status were more likely to use substances than their peers. Thus, individual approach to prohibiting substance use may be less ineffective than group approach including close peer. To examine substance use and negative consequences such as condomless sex among high school students, further studies should include extrinsic factors, such as environment, social networks, and peer relationships based on the theory of triadic influence (Danielson et al., 2014).

Adolescents' social networks constitute a social and contextual factor that may significantly influence adolescents' decisions to use substances. According to the theory of triadic influence, sociocultural and environmental factors can affect one's attitude toward a behavior and further influence the behavior choice (Flay & Petraitis, 1994). As discussed above, peer pressure and peer support within adolescents' social network can affect adolescents' substance use. Nurses and other healthcare providers need to understand the unique and significant peer interactions among adolescents to design effective educational interventions. The findings from our study support the findings of the available literature suggesting that we need to advocate for the importance of educating adolescents on substance use, especially tobacco use and its impact on health outcomes while addressing the dynamics of both peer pressure and peer support. Although our study results did not show significant association between condomless sex and other substance use, sexual education in adolescents should include substance use. Not only is substance use clustered with sexual intercourse (McAloney, 2015), substance use is significantly associated with condomless sex and multiple sexual partners in adolescents regardless of the type of substance adolescents engage in (Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015).

When female students had multiple sex partners, they failed to use condoms at the last sexual intercourse. Intercourse with multiple sexual partners has been known as a risky sexual behavior (Dunn et al., 2008; Elkington et al., 2010; Howard & Wang, 2004a; Santelli et al., 2009). Compared to the previous YRBS data collected in 1992, we found a consistent pattern in males; there was no significant association between the number of sexual partners and condom use at last intercourse among sexually active males. However, female adolescents with multiple sex partners significantly failed to use the condom at the last intercourse.

Our study partially confirmed demographic differences in condomless sex. According to the theory of triadic influence, intrapersonal characteristics have direct effects on self-determination, which may influence one individual's behavior choices (Flay & Petraitis, 1994). Among males, non-Hispanic African American students were less likely to use condoms during sexual intercourse compared to non-Hispanic White students, consistent with a CDC report (2013). Based on the national survey of family growth from 2006 to 2010, non-Hispanic African Americans reported lower levels of single or dual use of any contraception method (including condoms, pills, and other hormonal methods) compared to their White counterparts (Martinez et al., 2011). The proportion of non-contraception users was 18.30% among non-Hispanic African American, which was significantly higher than 11.8% of non-Hispanic Whites (Martinez et al., 2011).

Study Limitations and Future Studies

Most of the study limitations result from the study design using a cross-sectional survey. First, most data were self-reported, associated with increasing likelihood of recall bias. The three major recall periods for the study variables—the last intercourse, 30 days, and 3 months—generated different degrees of recall bias. Moreover, substance use may have occurred after the last sexual intercourse, thus the survey did not necessarily capture a causal relationship where condom use was assessed.

Second, we had limited data available for this secondary data analysis; our analyses could not include factors regarding the social-cultural environment and social situations that are critical to understanding substance use in adolescents according to the theory of triadic influence (Donovan & Jessor, 1985; Dunn et al., 2008; Flay & Petraitis, 1994). Some questions force students to respond given answers without consideration of minorities. For example, a question regarding student's gender provide only two options, 'male' or 'female.' Thus, there is the potential to miss information of transgender students and their relevant risk of condomless sex. In addition, the difference between heterosexual and homosexual penetrators should be considered for the future study regarding IPV, forced sex and condomless sex among adolescent males because a previous research indicated that the association did not differentiate (Smith & Ford, 2010).

We suggest future theory-based research using prospective data collection, to generate in-depth understanding of the research areas examined in the study. The YRBS questionnaire should be revised to reflect diverse perspectives and need of cultural minorities. In addition, a combined YRBS dataset integrating data from 1991 to 2013 is available from CDC website, thus it is possible to investigate national trends on this topic using sequent secondary data analysis of the 13-year dataset.

Implications for School Nurses

Comprehensive risk reduction education should also be emphasized in health education to meet different needs of female and male adolescents. School nurses, as a key contact for adolescents within the educational system, are integral to implementing comprehensive and tailored health education programs that address risky sexual behaviors and negative health outcomes.

In comprehensive sex education, school nurses have a vital role as health care providers, health educators, and liaisons between the school, family, and community. In developing sex health education and promotion programs, school nurses need to consider gender-specific needs in promoting safe sex (CDC, 2012b). For both male and female students, comprehensive sex education should focus on their sexual empowerment, including strategies for negotiating for safe sexual practices and how to recognize and prevent sexual coercion. Education about healthy relationships is imperative to ensure that both females and males can develop relationships grounded in mutual respect, which can offset the power differentials that may increase adolescents' vulnerability to sexual coercion and intimate partner violence.

In addition, given the potential connection between childhood sexual abuse and, IPV, forced sex, and condomless sex, school nurses need to screen students, particularly adolescent males, for history of childhood sexual abuse. In addition, school nursing have to understand pathways linking physical abuse and risky sexual behavior including condomless sex and forced sex. Based on our general bias, male students are at higher risk for under-screening or under-reporting of sexual abuse. Thus, careful assessment and counseling services should be offered to both genders considering the history of IPV and forced sex.

Given the significant associations among substance use, condomless sex, and multiple sex partners in high school students, comprehensive health education programs should integrate substance use prevention that includes interactive role playing to address peer pressure versus support regarding substance use, as well as education about the influence of substance use in sexual behaviors, including safe or unsafe sexual practices. Our findings suggest that cigarette smoking is a significant contributing factor to condomless sex in female students, yet little research has been done and few programs target tobacco control in females (Amos, Greaves, Nichter, & Bloch, 2012). Despite the literature suggesting that insufficient research has been conducted regarding tobacco use among female adolescents, there is a wealth of literature demonstrating that substance use of any kind increases risky health behaviors (Camenga et al,

2006). They can adapt the Institute of Medicine (IOM) Mental Health Intervention Spectrum Model to substance use prevention (Patestos, Patterson, & Fitzsimons, 2014) in addition to using established CDC-recommended STD/HIV prevention programs to optimize health outcomes (CDC, 2010).

School health professionals should also ensure adolescents' access to sexual services (Spencer, Maxwell, & Aggleton, 2008), such as providing comprehensive sexual health services in school based clinics or resources to local public health departments and free clinics. As well, the CDC has identified effective HIV and STD prevention programs targeting multiple populations of adolescents (2010), which can be integrated into education programs, coordinated by school nurses between educational and health care settings.

Additionally, school health professionals can coordinate educational programs about sexual health and relationships. Cultural and social factors need to be considered when developing educational programs that will be sustainable and effective to meet specific racial groups. For example, the 2014 Guidelines for Culturally Competent Nursing Care (Douglas et al, 2014) can be an effective framework to ensure that nursing care, including education, assessments, and treatment, provided in diverse school settings is culturally-relevant to promote optimal health outcomes. School nurses may consider re-designing educational program curricula using our study findings to increase cultural competency to facilitate successful interventions—in this case, especially with non-Hispanic African American group. Cultural norms may influence adolescents' engagement in sexual activity, such as the roles of the individuals within sexual relationships (traditional power differentials), the goal of the roles within the relationship (transactional versus equal), and relationships that are do not meet the cultural norms (homosexual vs. heterosexual). School nurses need to consider these factors when planning and implementing sex education curricula.

School nurses can coordinate such peer-led programs in after-school programs or as components of health-focused curricula. Adolescent peer-led interventions may draw upon common social norms between the facilitator and participants that are not necessarily present between the school nurse and the target audience. For example, peer group interventions have been used as an effective strategy to empower adolescents to make positive sexual health decisions and engage in self-protection in sexual relationships (Hsu, Lien, Lou, Chen, & Wang, 2010).

Conclusions

In conclusion, there are significant differences in condomless sex between male and female high school students. In general, intimate partner violence is associated with the failure to use a condom at the last sex intercourse. Smoking influenced condomless sex differently between the male and female adolescents. To promote protected and safe sex, health education for high school students should be tailored to gender-specific needs and their unique risk factors. In addition, preventing smoking and empowering adolescents experiencing intimate partner violence should be part of comprehensive health promotion and sex education.

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Figure 1. Conceptual Framework: Theory of Triadic Influence

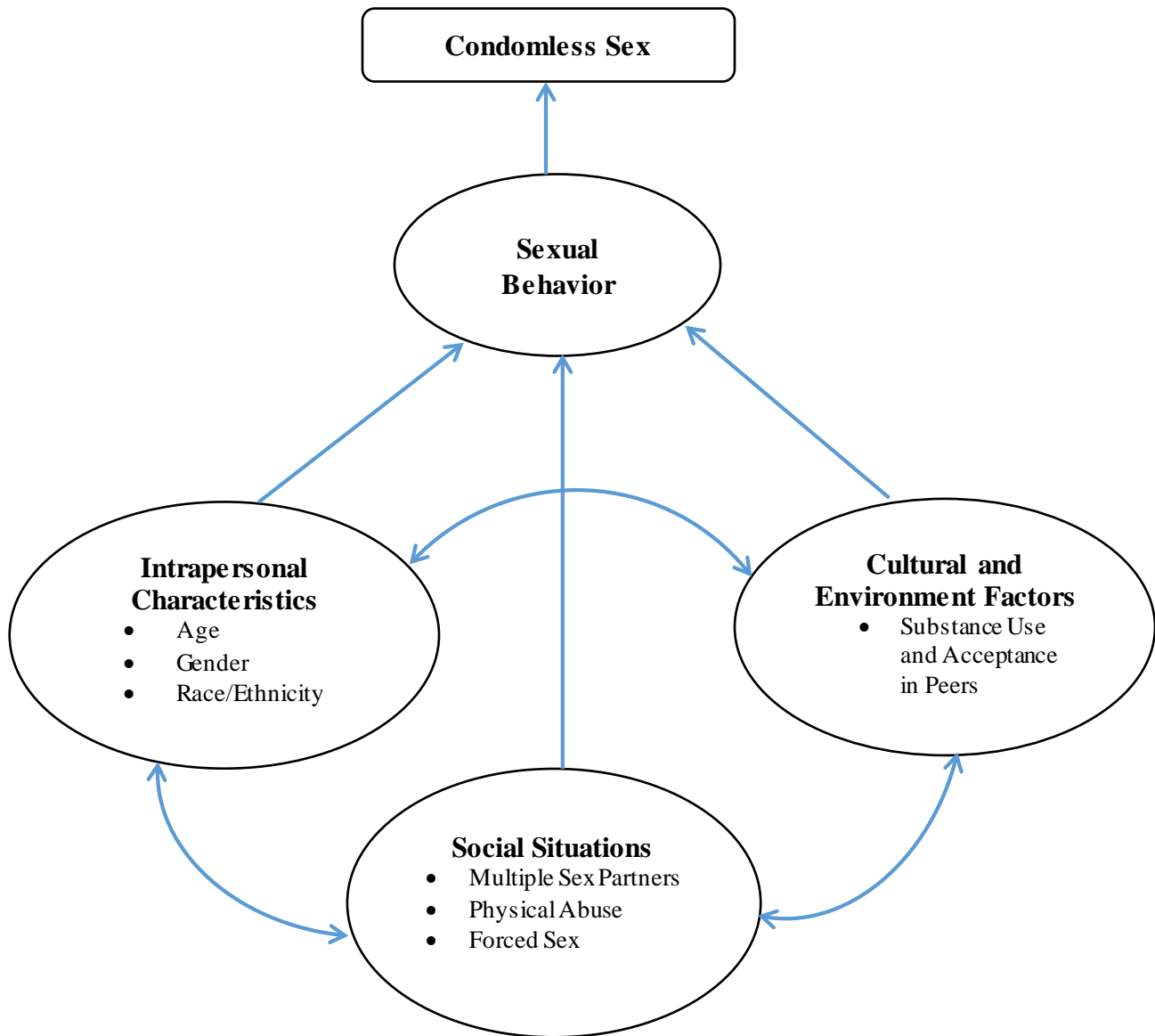


Table 2. Characteristics of High School Students Who are Sexually Active

	Total	Male (49.90%)	Female (50.10%)	<i>p</i> values
Age, mean (<i>SD</i>) (Unit: Year)	16.42(.03)	16.42(.04)	16.43(.04)	.86 ^a
Race and ethnicity, % (SE)				
Non-Hispanic White	56.29(2.93)	26.85(1.10)	29.44(1.00)	.001 ^b
Hispanic	19.00(2.01)	10.01(1.71)	8.99(1.71)	
Non-Hispanic African American	16.19(1.52)	8.63(1.72)	7.56(1.72)	
Non-Hispanic Asian and other	8.52(.62)	4.43(4.71)	3.99(4.51)	
Grade, % (SE)				
9 th	17.04(1.00)	9.47(2.34)	7.57(2.34)	.03 ^b
10 th	22.95(.82)	11.31(2.15)	11.64(2.15)	
11 th	27.80(0.73)	13.93(1.34)	13.87(1.34)	
12 th	32.30(0.93)	15.18(1.71)	17.12(1.71)	
History of sexual activity				
Age at first sex, Mean (<i>SD</i>) (Unit: Year)	14.43(.04)	14.14(.06)	14.69(.05)	.76 ^a
Numbers of sexual partners, Mean (<i>SD</i>)	1.62(.02)	1.88(.04)	1.37(.02)	.66 ^a
Condomless sex, % (SE)	39.70(13.45)	16.44(1.11)	23.26(1.11)	.001 ^b
Experienced physically abused by partner, % (SE)	17.42(0.82)	8.61(2.60)	8.61(2.60)	.86 ^b
Experienced forced sex by partner, % (SE)	15.73(0.71)	4.31(2.20)	11.42(2.21)	.001 ^b
History of substance use, % (SE)				
Smokers	34.74(1.24)	18.45(1.70)	16.29(1.72)	.03 ^b
Alcohol drinkers	62.41(0.93)	32.33(1.52)	30.08(1.71)	.03 ^b
Marijuana users	43.10(1.43)	23.88(1.23)	19.12(1.71)	< .001 ^b
Cocaine users	6.52(0.51)	4.51(3.01)	2.01(3.03)	< .001 ^b

Note. ^a Tested by independent t tests ^b Tested by Chi-square

Table 3. Binary Logistic Regression Analyses of Associations between Demographical and Sexual activity-related Characteristics and Having a Condomless Sex

Dependent Variable: Having a condomless sex: 0 = No, 1 = Yes	Male students		Female student	
	aOR	95% CI	aOR	95% CI
Age	1.08	.96 - 1.21	1.09	.97 - 1.22
Race/ethnicity compared to Non-Hispanic White				
Hispanic	.95	.65 - 1.39	1.10	.83 - 1.46
Non-Hispanic African American	.61**	.42 - .89	1.17	.83 - 1.65
Non-Hispanic Asian or others	1.02	.48 - 2.15	.88	.28 - 2.77
Physically abused by sexpartner	1.76**	1.26 - 2.45	1.56**	1.17 - 2.09
Experienced forced sexby the partner	2.53***	1.61 - 3.98	1.25	.91 - 1.73
Smokers	1.07	.79 - 1.43	1.55**	1.18 - 2.05
Alcohol drinkers	1.09	.80 - 1.50	1.10	.86 - 1.40
Cocaine use	1.47	.88 - 2.45	1.17	.60 - 2.31
Marijuana use	1.08	.72 - 1.61	1.18	.90 - 1.53
Numbers of sexpartner	1.08	.96 - 1.19	1.15*	1.01 - 1.31

Note. CI= Confidence interval; aOR= Adjusted odds ratio;

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 1. Detailed YRBS Questions to Operationalized Study Variables

Note.: IV = Independent variable; CV = Controlled variable

Constructs	Study variables	YRBS question to measure	Data coding
Cultural and environmental factors	Cigarettes smoking (IV)	“During the past 30 days, on how many days did you smoke cigarettes?”	<ul style="list-style-type: none"> • Non-smoking group responded with “0 days” (coded as “0”). • Smoking group responded to one of a number of categories ranging from 1 to 30 days (coded as “1”).
	Alcohol drinking (IV)	“During the past 30 days, on how many days did you have at least one drink of alcohol?”	<ul style="list-style-type: none"> • Non-drinking group responded with “0 days” (coded as “0”). • Alcohol drinking group responded to one of a number of categories ranging from 1 to 30 days (coded as “1”).
	Marijuana use (IV)	“During the past 30 days, how many times did you use marijuana?”	<ul style="list-style-type: none"> • Non-marijuana users responded with “0 times” (coded as “0”). • Marijuana users responded one of a number of categories ranging from 1 to 40 times (coded as “1”).
	Cocaine use (IV)	“During the past 30 days, how many times did you use any form of cocaine, including powder, crack, or freebase?”	<ul style="list-style-type: none"> • Non-cocaine users responded with “0 times” (coded as “0”). • Cocaine users responded one of a number of categories ranging from 1 to 40 times (coded as “1”).
Social situations	Numbers of sexual partners (IV)	“During the past 3 months, with how many people did you have sexual intercourse?”	<ul style="list-style-type: none"> • Count ranging from 1 to 6
	Physical abuse by partners (CV)	“During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?”	<ul style="list-style-type: none"> • Experienced physical abuse by the partner (coded as “1”) • Never experienced physical abuse by the partner (coded as “0”)
Intrapersonal characteristics	Forced sex by partners (CV)	“Have you ever been physically forced to have sexual intercourse when you did not want to?”	<ul style="list-style-type: none"> • Physically forced to have sexual intercourse (coded as “1”) • Never physically forced to have sexual intercourse (coded as “0”)
	Age (CV)	“How old are you?”	<ul style="list-style-type: none"> • Self-reporting years after birth.
	Race/ethnicity (CV)	“Are you Hispanic or Latino?” “What is your race?”	<ul style="list-style-type: none"> • Self-reporting: Non-Hispanic White (coded as “0”), non-Hispanic African American (coded as “1”), non-Hispanic Asia (coded as “2”), Hispanic (coded as “3”), and non-Hispanic other (coded as “4”).