

The Effects of HIV/AIDS Knowledge During Adolescence:  
The Role of This Knowledge in Predicting Sexual Behaviors and Outcomes

By

Adriane Kline

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Advisors: Dr. Justin Heinze and Dr. Marc Zimmerman

### Abstract

HIV/AIDS knowledge during adolescence has been projected to be a potential predictor of engagement in current and future risky sexual behaviors, as well as future STI outcomes. Multiple incongruities prevail within existing literature concerning the level of HIV/AIDS knowledge youth possess and the implications this knowledge has on engagement in sexual behaviors and outcomes. This study aimed to build upon previous findings by examining African American youth ( $n = 681$ ) involved in a larger longitudinal study proceeding from adolescences into adulthood (ages 13-25). The following variables were measured: HIV/AIDS knowledge, sexual behavior, personal perceived risk of HIV contraction and presence of an STI. Associations between HIV/AIDS knowledge, risky sexual behaviors and personal perceived risk were analyzed. In addition, the presence of an STI was assessed to indicate if outcomes were predicted by one's HIV/AIDS knowledge, perception of personal vulnerability for the contraction of HIV, sexual behavior, and gender. Findings demonstrated significant relationships between HIV/AIDS knowledge and increased condom use as well as HIV/AIDS knowledge and fewer sexual partners during current sexual activity. One's personal perceived risk had no significant relationship with HIV/AIDS knowledge. Interestingly, personal perceived risk was associated with a higher number of sexual partners as well as increased condom use. The overall model indicated STI outcomes were predicted by one's HIV/AIDS knowledge, number of sexual partners, as well as one's gender. The findings of this study support knowledge as an effective intervention for the prevention of negative sexual health outcomes.

*Keywords:* Adolescence, African American, HIV/AIDS knowledge, Sexual behavior, Personal perceived risk of HIV contraction, Presence of an STI

## The Effects of HIV/AIDS Knowledge During Adolescence:

### The Role of This Knowledge in Predicting Sexual Behaviors and Outcomes

#### **Background**

Human immunodeficiency virus (HIV) is an infection spread through sexual activity and direct contact with infected blood; it can also be passed from mother to child during pregnancy or by breast-feeding. This virus attacks and weakens the body's immune system causing severe depletion in white blood cells and eventually becomes a chronic condition called 'acquired immunodeficiency syndrome (AIDS).' AIDS is the final stage of HIV infection, and at this stage, it is necessary for victims to seek medical attention in order to prevent death.

According to the Center for Disease Control and Prevention, at the end of 2009 approximately 1.1 million people in the United States were living with HIV (Center for Disease Control and Prevention, 2013a). Specific groups such as youth, men who have sex with men, African Americans, and injection drug users are placed at higher risk for HIV infection than others (Bazargan, Kelly, Stein, Husaini, & Bazargan, 2000; Center for Disease Control and Prevention, 2013a; Pulerwitz, Amaro, De Jong, Gortmaker, & Rudd, 2002; Voisin, Hong, & King, 2012). In particular, young people, defined as individuals between the ages of thirteen and twenty-nine, were diagnosed with over one third of all new HIV infections in 2009 (Center for Disease Control and Prevention, 2013a). Due to this disproportional infection incidence based on age, adolescents should be a central focus for further HIV research and prevention. As there is no cure or vaccine for HIV, individual behavior is essential in preventing HIV transmission (Archibald et al., 2001).

African Americans experience HIV infection rates ten times higher than their white counterparts (Beatty, Wheeler, & Gaiter, 2004). According to the Center for Disease Control and Prevention (2013b), several factors place African Americans at this elevated risk for HIV

contraction. Firstly, the African American race is plagued with elevated HIV infection rates due to racial tendencies to have sexual intercourse with other African American individuals; this places them in a position of heightened risk for new cases of infection. In addition, African Americans experience higher rates of poverty when compared to all other races and therefore face challenges and complications directly effecting health outcomes due to their lower socioeconomic status (i.e. access to quality health care and quality HIV prevention education). Ebrahim, Anderson, Weidle, and Purcell (2004) found when compared to whites, individual HIV/AIDS knowledge level among African Americans was significantly lower. The effects of low socioeconomic status directly and indirectly contribute toward the higher levels of HIV incidence among the African American population (Center for Disease Control and Prevention, 2013b). The prevalence of HIV infection within the African American community demands further consideration.

At this point, it is important to consider sexual behaviors and decisions that place adolescents at heightened risk for the contraction of HIV. The Kaiser Family Foundation (2012) recognizes that HIV sexual risk behaviors include engaging in unprotected sexual activities, having sexual intercourse with multiple partners, and failing to inquire about a partner's HIV status. Santelli, Brener, Lowry, Bhatt, and Zabin (1998) examine potential risk factors related to sexual intercourse with multiple partners. They suggest that due to the inconsistency of condom use among youth engaging with a higher number of sexual partners increases one's risk of contracting HIV. By stating this, they also recognize the importance of consistent condom use in preventing the transmission of HIV. D'Angelo, Abdalian, Sarr, Hoffman, and Belzer (2001) studied HIV status disclosure among HIV infected youth and found only 47.5% of the time did these infected individuals inform their sexual partners that they were HIV positive. However, when that respondent's sexual partner was also HIV positive, the participants in D'Angelo et al.'s study were three times more likely to disclose

their HIV positive status. The results of this study are concerning due to the low levels of HIV status disclosure especially when one's partner is HIV negative. Based on previous research outlined above, it is critical to investigate and further understand factors that influence individual engagement in risky behaviors.

As the following thesis focuses on circumstances in which one engages in specific behaviors, application of the health belief model is utilized. This model suggests that individuals who perceive themselves to be at high risk for undesired outcomes will be less likely to engage in the behaviors that place them at risk for these outcomes (Janz & Becker, 1984). According to this framework, adolescents who consider themselves at high risk for HIV contraction are less likely to engage in unsafe sexual behaviors, such as sexual intercourse without the use of a condom and sexual intercourse with multiple partners. This model is important to keep in mind as one considers an individual's likelihood to participate in risky behaviors.

Overall, this thesis intends to assess adolescent HIV/AIDS knowledge level, factors that contribute toward said knowledge level, and the ways in which HIV/AIDS knowledge tends to impact current and future sexual behaviors, as well as sexually transmitted infection (STI) outcomes. It recognizes the impact of individual perceived risk for HIV contraction as a mediator between HIV/AIDS knowledge and sexual behavior. As a whole, it aims to contribute toward existing literature focusing on youth and HIV prevention and intervention.

### **Influences of Risky Sexual Behavior**

**HIV/AIDS knowledge and risky sexual behavior.** One major influence of risky sexual behavior is lack of HIV/AIDS knowledge among adolescents. Although a large amount of research focuses on the level of HIV/AIDS knowledge among youth, numerous contradictions within the literature exist (Bazargan et al., 2000; Jadack, Hyde, & Keller, 1995; Kirby, Laris, & Rolleri, 2007; Swenson et al., 2010). For example, some experts state

the greater amount of HIV/AIDS knowledge an individual possesses, the more likely they are to engage in safe sexual behaviors (Jadack, et al., 1995; Swenson et al., 2010). Specifically, Swenson et al. (2010) examined low-income African American adolescents and found HIV/AIDS knowledge concerning facts regarding HIV testing and effective condom use was limited. They recognize this limited knowledge as problematic due to the role HIV/AIDS knowledge assumes as an important contributor to sexual health and behavior. This work suggests that higher HIV/AIDS knowledge translates into safer sexual behaviors among adolescents.

Kirby et al. (2007) based their review on studies measuring the effects of “curriculum-based sex and HIV education programs on sexual behavior” (p. 206). They found that within the United States, the majority of education programs were effective in delaying onset of sexual activity and increasing condom use among young people under the age of twenty-five. These findings suggest that through HIV education programs, which enhance one’s knowledge, young people can be encouraged to engage in safer sexual behaviors.

However, conflictingly, Bazargan et al. (2000) and Anastasi, Sawyer, and Pinciaro (1999) found no correlation between high HIV/AIDS knowledge and decreased risky sexual behavior. Both studies recognized high levels of HIV/AIDS knowledge present among college students as well as positive thoughts surrounding condom use as a preventive method for the transmission of HIV; yet, interestingly, their findings suggest that college students tend to be unsuccessful in translating their HIV/AIDS knowledge into consistent behaviors in order to protect their sexual health.

Bachanas et al. (2002) investigated two specific areas of HIV/AIDS knowledge among adolescents: knowledge of transmission and information regarding the prognosis of this infection. According to their work, no significant relationship between HIV/AIDS

knowledge and safer sexual behavior exists among adolescents. In addition to this finding, their study showed older teenagers, between the ages of sixteen and nineteen, have a higher level of HIV/AIDS knowledge than teenagers between the ages of twelve and fifteen, but older teenagers claim to have a greater number of peers engaging in sexual activities without use of a condom. The implications of this discovery suggest that higher HIV/AIDS knowledge does not encourage safer sexual behaviors; however, in drawing this conclusion, it is important to keep in mind that older individuals are more likely to be sexually active.

In many studies, the young report high levels of HIV/AIDS knowledge (Anastasi et al., 1999; Bazargan et al., 2000); yet, Inungu, Langford, Mumford, and Younis (2009) found this to be untrue. According to their work, misconceptions regarding HIV transmission are common among college students. For example, 35% of college students stated they did not know whether or not mosquitos could transmit HIV (Inungu et al., 2009). Likewise, studies conducted on African American youth have shown low levels of HIV/AIDS knowledge. For example, Chimnani, Morris, and Ulmer (2003) examined a population composed of over 70% African Americans and noted that more than 25% of the population were unsuccessful in accurately answering basic questions regarding routes of transmission of HIV. Swenson et al. (2010) administered an HIV/AIDS knowledge questionnaire to low-income African American adolescents and found, on average, only 50% of the items were answered correctly. These findings indicate low levels of HIV/AIDS knowledge among youth and the need for further investigation in order to accurately assess how much young people actually know about HIV.

As displayed above, dissonance is prevalent within existing literature. Controversies regarding the level of HIV/AIDS knowledge adolescents possess and the ways in which this knowledge translates into sexual behaviors are pervasive amid research findings, and therefore, it is important to further examine HIV/ AIDS knowledge among adolescents. In

order to understand implications of HIV/AIDS knowledge, predictors of said knowledge demand consideration.

Research findings indicate when individuals know someone who has tested positively for HIV their overall level of personal HIV/AIDS knowledge is heightened (Demmer & Careleo, 2001; Loffredo & Opt, 2004). In addition to this discovery, schools are an important source of HIV/AIDS knowledge (Inungu et al., 2009), and due to this, high school sexual education programs assume an influential role as a predictor of HIV/AIDS knowledge among adolescents. Ebrahim et al. (2001) recognize the existing HIV/AIDS knowledge gap between high-income and low-income individuals; therefore in the context of sexual education programs, individual socio-economic status as well as the caliber of one's school district must be taken into consideration as they assume a predictive role in one's HIV/AIDS knowledge.

Swenson et al. (2010) demonstrate an additional predictor of HIV/AIDS knowledge by displaying a relationship between higher knowledge levels and sexual experience among adolescents; participants in their study who claimed to be more sexually experienced scored significantly higher on an administered HIV/AIDS knowledge questionnaire. In short, several distinct predictors of HIV/AIDS knowledge prevail within existing literature, and said knowledge variable may or may not have vital implications in determining engagement in risky sexual behaviors.

**Substance use and risky sexual behavior.** Extensive research investigates substance use and abuse in relation to levels of engagement in risky sexual behaviors among adolescents. Bryan, Magnan, & Schmiede (2012) found results that were consistent with previous discoveries displaying, through a longitudinal study, that condom use decreased significantly when an individual or his/her partner was under the influence of marijuana. Additional research has shown high levels of alcohol and drug use predict lower rates of condom use



among high school and college students. These same factors also predicted higher rates of STIs (Bachanas et al., 2002; LaBrie, Earleywine, Schiffman, Pedersen, & Marriot, 2005; Tapert, Aarons, Sedlar, & Brown, 2001). Findings also suggest heavy drinking among college students tends to be correlated with a higher number of sexual partners (Cooper, 2002; McEwan, McCallum, Bhopal, & Madhok, 1992; Scott-Sheldon, Carey, & Carey, 2010). Cooper (2002) stated that addressing individual drinking habits has important implications in reducing risky sexual behaviors and therefore is important in HIV prevention. Due to consistent findings surrounding the relationship between sexual behavior and substance use and abuse, these areas will not be investigated in detail in this thesis; however, it should be noted that they are important within the context of adolescent behavior.

### **Personal Perceived Risk and Sexual Behavior**

Individual perspectives regarding personal contraction of HIV, also called perceived risk, play a crucial role in one's attitudes toward sexual behavior. During an investigation of college student views on perceived risk of HIV contraction, Loffredo and Opt (2004) found that gender and ethnicity play an important role in perceived vulnerability. Loffredo and Opt's findings showed males tend to have a lower perceived risk than females. In addition, their results indicated that African Americans are more inclined to have a higher level of concern for personal contraction of HIV than their white counterparts. These findings are consistent with the 2000 National Survey of Teens (Kaiser Family Foundation, 2002). Also, according to Loffredo and Opt, level of perceived vulnerability for HIV contraction increased when one had personal acquaintances living with HIV or who had died due to AIDS. A sample of African American youth showed females tend to have a higher and more accurate risk perception than males (Newman & Zimmerman, 2000); however, in general, all youth appear to have a low risk perception of personal contraction of HIV even when they engage in risky sexual behaviors (Inungu et al., 2009; Lollis, Johnson, Antoni, & Hinkle, 1996).

Stevenson, Davis, Weber, Weiman, and Abdul-Kabir (1995) declared that adolescents who do not view themselves as ‘at risk,’ in other words have a low personal perceived risk of HIV infection, are more likely to engage in risky sexual behaviors. This finding is consistent with the framework of the health belief model. Likewise, Kershaw, Ethier, Niccolai, Lewis, and Lckovics (2003) investigated sexual behaviors among female adolescents and discovered actual HIV risk tended to be consistent with perceived risk. However, in general, their study showed several misperceptions, and it should be noted that the majority of female participants who engaged in risky sexual behaviors failed to see their behaviors as ‘risky.’ Interestingly, Demmer and Careleo (2001) discovered the reverse relationship and stated that HIV/AIDS knowledge tends to be negatively correlated with individual concern for personal HIV contraction. In this investigation, college students who possessed a high level of HIV/AIDS knowledge, defined by a 40-item questionnaire, appeared to express low concern for the contraction of HIV. Contradicting discoveries suggest the need for additional investigation.

**Gendered attitudes toward condom use.** Previous findings suggest that the gender of an individual plays a crucial role in personal views toward sexual behavior (Jadack et al., 1995; Pulerwitz et al., 2012). Because these attitudes influence an individual’s likelihood to engage in safer sexual behaviors, it is important to acknowledge gendered differences. For example, according to Jadack et al. (1995), women tend to associate sexual intercourse without the use of a condom with long term and serious relationships. On the other hand, men relate sexual intercourse without the use of a condom to an unplanned or a spontaneous ‘hook up.’ Overall, gender plays a significant role in personal opinions regarding risky sexual behavior, and therefore, it is an important factor within this thesis.

### **Indicators of STI Testing**

The Center for Disease Control and Prevention suggests STI testing annually for both men and women. The center recommends that individuals seek HIV testing when one shares needles, engages in unprotected sex with multiple partners, has been diagnosed with an STI, or has had sexual intercourse with someone who has engaged in any of the behaviors listed above (Center for Disease Control and Prevention, 2013c).

STI testing is important because the resulting consequences have proven to be severe when diagnosis and treatment are delayed. Anatasi et al. (1999) found older college students tend to be tested more often than younger college students. In an additional study, slightly over half of the students who reported a high level of perceived vulnerability had sought out HIV testing (Loffredo, & Opt, 2004). In general, those who reported having been tested for the HIV virus are the minority (Loffredo, & Opt, 2004; Swenson et al., 2010). This indicates that a higher level of perceived vulnerability will increase an individual's chance of seeking HIV testing. College students tend to avoid testing for fear of becoming victims due to social stigmas (Barth, Cook, Downs, Switzer, & Fischhoff, 2002). Moreover, Demmer and Caroleo (2001) declare the majority of individuals who avoid testing do so because they don't see their behaviors as risky.

A key focus of this thesis aims to examine HIV/AIDS knowledge during adolescence related to future STI outcomes as limited research focuses on such health seeking behaviors (Barth et al., 2002). Ebrahim et al. (2004) investigated present levels of HIV/AIDS knowledge and its effect on testing. Interestingly, they found levels of HIV/AIDS knowledge to be consistent among individuals who had and had not been tested for HIV and instead found levels of testing to vary across other factors such as race, ethnicity, and education level. Compared to their white counterparts, African Americans were more likely to report that they had been tested for HIV both in the past and more recently, as defined by testing in the last twelve months. In general, the implications of HIV/AIDS knowledge on health tend

to be overlooked in literature, and as knowledge is a changeable factor, it demands further examination.

### **Current Study**

Due to existing contradictions within previous HIV/AIDS research, further investigation is necessary. The current study intends to explore research gaps surrounding predictors of adolescent HIV/AIDS knowledge and the implications of this knowledge on condom use, number of sexual partners, and future STI contraction. More specifically, it aims to provide additional consideration for the following questions: does previous exposure to someone who has either tested positively for HIV or been diagnosed with AIDS determine higher HIV/AIDS knowledge levels? Does a higher level of HIV/AIDS knowledge among adolescents increase condom use during current and future sexual activity? Does a higher level of HIV/AIDS knowledge among adolescents decrease the number of current sexual partners and the number one will have later in life? How does perception of personal vulnerability for HIV contraction mediate the relationship between HIV/AIDS knowledge among adolescents and engagement in risky sexual behaviors? Are STI outcomes based upon the following predictive variables: HIV/AIDS knowledge, perceived risk, sexual behavior, and gender? Do gendered differences of one's perceived risk for the contraction of HIV predict STI outcomes? Do gendered differences in HIV/AIDS knowledge predict STI outcomes?

As stated above, the current study aims to contribute toward existing literature that focuses on the influence of adolescent HIV/AIDS knowledge in regards to current and future sexual behavior, as well as STI contraction. This study recognizes the importance of HIV prevention and contributes toward the development of effective intervention methods among adolescents. Figure 1 shows a conceptual model targeting the identified gaps present within previous research.

## **Methods**

### **Participants**

This study examined 681 African-American adolescents (51% female) who were included in a larger longitudinal study. This longitudinal analysis selected students from a high school district in Flint, Michigan who had a grade-point average below 3.0 and were enrolled in their freshman year of high school during the fall of 1994. Individuals who were diagnosed with either a developmental disability or an emotional impairment were not entered in this study. Data from waves 1, 2, 3, 4, and 8 were analyzed for the present study. Wave 1 was used purely for the collection of demographic information. Additionally, waves 2, 3, 4, and 8 were selected because they extensively consider individual HIV/AIDS knowledge, personal perceived risk, condom use, number of sexual partners and STI contraction during stages of increased sexual behavior.

### **Procedure**

For waves 1 through 4, data was collected via face-to-face interviews conducted within private rooms of the student's school or in a community setting (i.e. local research office, church) if participants could not be located in school. Subsequent interviews (waves 5 through 8) primarily took place in community settings. Following a 50 to 60 minute interview, participants were asked to complete a self-administered questionnaire for the collection of data on alcohol and substance use and sexual behavior. By wave 4, this longitudinal study had a 90% response rate, which decreased to 68% by wave 8.

### **Measures**

In order to investigate the questions of interest in the current study, four different variables were incorporated: (1) HIV/AIDS knowledge- knowledge of condom use in preventing the transmission of HIV and how much one felt they knew about HIV/AIDS; (2) risky sexual behaviors- assessed through frequency of condom use and the number of sexual

partners one has; (3) personal perceived risk- how vulnerable one perceives him or herself to be for the contraction of HIV; (4) presence of an STI- has the individual ever been infected with an STI.

**Knowledge of HIV/AIDS.** This variable was calculated in waves 2 and 3 based upon participant responses to two individual questions. Firstly, participants were asked how much they knew about HIV/AIDS. The four answer choices ranged from “Nothing= 1” to “A lot= 4” for this question. The second question asked how effective condoms were in preventing the contraction of AIDS through sexual activity with the four possible answer options ranging from “Very effective= 1” to “Don’t know how effective= 4.” Responses to the latter question were reverse coded. This variable was calculated by averaging the scores of these two questions for waves 2 and 3 separately. These values were then averaged again resulting in a single HIV/AIDS knowledge score. A higher value for this score indicated a greater amount of HIV/AIDS knowledge. An additional component of HIV/AIDS knowledge investigated a predictor variable at wave 2- “knowing someone who has AIDS or who tested positively for HIV.” Within the current study, this variable is predictive of one’s HIV/AIDS knowledge level.

**Sexual behavior.** In order to assess condom use, participants were asked a close-ended question at waves 2, 3, 4, and 8 (“How often have you used a condom when you've had sexual intercourse?”). For this question, answer options ranged from “Almost never= 1” to “Always= 5.” To measure the number of sexual partners, participants were asked, “In the last year, how many sexual partners have you had?” For the current study, participant responses were utilized from waves 2, 3, 4, and 8.

**Personal perceived risk of HIV contraction.** This variable was calculated at waves 2 and 3 based upon participant responses to two individual questions. The first question assessed the participant’s concern of contracting AIDS. Response choices for this question ranged from

“Not at all concerned= 1” to “Very concerned= 5.” The second question asked participants what their chances were of getting the AIDS virus. This question had four answer options ranging from “High= 1” to “No chance= 4.” To calculate individual perceived risk, the latter question was reverse coded, z scores were computed, and then averaged. Perceived risk scores for waves 2 and 3 were then averaged to provide a single value for this variable. A higher value on this scale designated a higher level of personal perceived risk.

**Presence of an STI.** STI history was collected from participants by asking the question, “Have you ever had a sexually transmitted disease such as syphilis or gonorrhea?” Examining responses to this question for waves 2, 3, and 4 created this variable. If a participant answered, “Yes” to this question in any of the waves mentioned above, a 1 was coded, and alternative responses or missing data was coded as a 2.

### **Analytical Plan**

Prior to investigating relationships within the present model, descriptive statistics for the sample including, HIV/AIDS knowledge, personal perceived risk, risky sexual behavior, and presence of an STI were analyzed. These tests were conducted to examine the mean and standard deviation for each of the selected variables. As outlined above, HIV/AIDS knowledge and personal perceived risk were calculated during waves 2 and 3 and then combined to create a single value. Said waves were chosen as the current study aims to interpret implications of HIV/AIDS knowledge and personal perceived risk on current and future sexual behaviors during stages of elevated sexual activity.

The first hypothesis aimed to address the implications of knowing someone who either tested positively for HIV or had been diagnosed with AIDS on one’s HIV/AIDS knowledge level. It was projected that familiarity with someone who was HIV positive or had been diagnosed with AIDS would be predictive of an elevated level of HIV/AIDS knowledge. To test this hypothesis, an independent samples *t*-test was performed to compare

the mean HIV/AIDS knowledge scores for participants who indicated prior exposure to someone who was either tested positively for HIV or had been diagnosed with AIDS and participants who indicated no such exposure. Familiarity was looked at in wave 2, because the current study specifically investigates this variable as a predictor of knowledge.

The next two hypotheses focused on the association between HIV/AIDS knowledge and risky sexual behavior. In order to address the hypothesis presented regarding HIV/AIDS knowledge and condom use, correlations between individual knowledge level and frequency of condom use at waves 2, 3, 4, and 8 were analyzed. This enabled an understanding of the ways in which knowledge is associated with current and future condom use during sexual activity. Subsequently, it was hypothesized that greater HIV/AIDS knowledge would be associated with fewer sexual partners. To test this prediction, correlations were conducted between HIV knowledge and number of partners at waves 2, 3, 4, and 8. The listed waves were selected in order to examine relationships between HIV/AIDS knowledge and quantity of current and future sexual partners.

It was hypothesized that an individual's perception of personal vulnerability for HIV contraction would mediate the relationship between HIV/AIDS knowledge and risky sexual behavior, defined by condom use and quantity of sexual partners. In other words, it was predicted that individuals with great HIV/AIDS knowledge would possess an elevated personal perceived risk. This heightened perception of vulnerability for the contraction of HIV would therefore be associated with more frequent condom use and fewer sexual partners. To assess these relationships, correlations were conducted. First, a correlation between HIV/AIDS knowledge and personal perceived risk was assessed to investigate the relationship between these two variables. Next, correlations between one's personal perceived risk and condom use at waves 2, 3, 4, and 8, as well as between one's personal perceived risk and number of sexual partners at waves 2, 3, 4, and 8 were analyzed. The



listed waves were specifically chosen in order to investigate the ways in which one's perception of personal vulnerability for HIV contraction is correlated with risky sexual behaviors during stages of increased sexual activity.

In order to address the final hypothesis, which aimed to assess the overall effectiveness of the present model, several different statistical analyses were completed. To examine the relationship between HIV/AIDS knowledge and future STI contraction, an independent samples *t*-test was conducted. This *t*-test compared the mean HIV/AIDS knowledge score for individuals who indicated presence of an STI at some point in waves 2, 3, and/or 4 and individuals who did not indicate presence of an STI during listed waves. Waves 2, 3, and 4 were selected as the present study aimed to investigate STI outcomes during stages identified by heightened sexual activity. Next, a logistic regression was performed to predict STI outcomes based upon the following predictor variables: HIV/AIDS knowledge, personal perceived risk, sexual behavior (wave 3), and gender. Again, this model targeted risky sexual behaviors occurring at wave 3 due to timing of one's sexual debut. The following logistic regression included two additional variables (gender \* personal perceived risk and gender \* HIV/AIDS knowledge) to determine whether or not gendered differences in the areas of perceived risk and HIV/AIDS knowledge assumed a significant role in gendered STI outcomes.

### **Results**

To view descriptive statistics for the following variables: HIV/AIDS knowledge, personal perceived risk, condom use, number of sexual partners, and presence of an STI, refer to Table 1.

It was predicted that individuals who knew someone who either tested positively for HIV or had been diagnosed with AIDS would possess an elevated level of HIV/AIDS knowledge when compared to individuals who did not know someone in this category. The

results of the conducted *t*-test suggested, on average, participants who indicated previous exposure to this familiarity variable scored lower on the HIV/AIDS knowledge scale than individuals who indicated no previous exposure; however, this difference was not significant,  $t(588) = -3.02, p > .05$ . The effect size was found to be  $r = .01$ . See Table 2 for complete *t*-test results.

Next, it was predicted that a relationship existed between HIV/AIDS knowledge and current as well as future risky sexual behavior. Specifically, it was predicted that greater HIV/AIDS knowledge would be correlated with a higher frequency of condom use and a lower number of sexual partners. Condom use in wave 2 was significantly related, in a positive direction, with a participant's HIV/AIDS knowledge,  $r = .11, p$  (one-tailed)  $< .05$ . In wave 3, condom use was marginally correlated, in a positive direction, to an individual's level of HIV/AIDS knowledge,  $r = .07, p$  (one-tailed)  $= .06$ . The number of sexual partners one engaged with in wave 2 was marginally correlated, in a negative direction, to an individual's level of HIV/AIDS knowledge in wave 2,  $r = -.80, p$  (one-tailed)  $= .06$ . Refer to Table 3 to view results of all correlations conducted on HIV/AIDS knowledge and engagement in risky sexual behaviors.

It was hypothesized that an individual's perception of personal vulnerability for HIV contraction would mediate the relationship between one's HIV/AIDS knowledge level and engagement in risky sexual behavior. The data did not display a significant relationship between one's HIV/AIDS knowledge and personal perceived risk for the contraction of HIV,  $r = .02, p$  (one-tailed)  $> .05$ . On the other hand, the results demonstrated a significant relationship between one's personal perceived risk and condom use in wave 3,  $r = .28, p$  (one-tailed)  $> .05$ . The number of sexual partners one had appeared to be significantly related to one's perception of personal vulnerability for HIV contraction, in a positive direction, for waves 2 and 4 ( $r = .15, p$  (one-tailed)  $< .05$ ;  $r = .13, p$  (one-tailed)  $< .05$ ). See

Table 4 for a complete display of correlations between HIV/AIDS knowledge and engagement in risky sexual behaviors.

Model effectiveness in predicting STI outcomes was tested by first running an independent samples *t*-test proceeded by two logistic regressions. The findings from the *t*-test displayed, on average, participants who indicated presence of an STI scored lower on the HIV/AIDS knowledge scale than participants who did not indicate presence of an STI. This difference was significant,  $t(594) = -2.24, p < .05$ . See Table 5 for the complete output of *t*-test results. The first regression aimed to examine the degree to which STI outcomes were based upon an individual's HIV/AIDS knowledge, personal perceived risk, sexual behavior, and gender. The findings displayed a significant model,  $X^2 = 15.12, df = 5, p = .01$ , Nagelkerke  $R^2 = .15$ . Refer to Table 6 for output on the full model. The final regression incorporated two additional variables: gender \* personal perceived risk, and gender \* HIV/AIDS knowledge in order to determine if STI outcomes within the gender variable depended upon gendered differences of perceived risk and gendered differences in HIV/AIDS knowledge. The overall model was significant ( $X^2 = 15.64, df = 7, p = .03$ , Nagelkerke  $R^2 = .16$ ); however, neither variable appeared to be significant within the equation (gender \* personal perceived risk:  $\beta = -.07, SE \beta = .82, \text{Wald's } X^2 = .01, p = .93, e^{\beta} = .93$ ; gender \* HIV/AIDS knowledge:  $\beta = -.77, SE \beta = 1.16, \text{Wald's } X^2 = .43, p = .51, e^{\beta} = .46$ ). Findings from a crosstabulation analysis conducted to investigate gendered outcomes for the STI variable can be viewed in Table 7.

### Discussion

This study assessed the role of HIV/AIDS knowledge in predicting current as well as future engagement in risky sexual behaviors and later STI outcomes among African American youth. It incorporated the implications of one's perception of personal vulnerability for the contraction of HIV and aimed to investigate gendered differences in

predicting STI outcomes based upon level of HIV/AIDS knowledge and personal perceived risk.

The first hypothesis stated that familiarity with someone who tested positively for HIV or had been diagnosed with AIDS would be predictive of an elevated level of HIV/AIDS knowledge; yet, the results indicated the effects of familiarity with someone who either tested positively for HIV or had been diagnosed with AIDS had no significant impact on adolescent HIV/AIDS knowledge. These findings contradict previous discoveries and do not support the hypothesis predicted within the current study (Demmer & Careleo, 2001; Loffred & Opt, 2004). This study adds to existing literature by indicating, through investigation, that familiarity is not a predictor of said knowledge level among youth. Due to these insignificant findings, this study suggests that alternate predictive factors impacting HIV/AIDS knowledge level among youth need to be considered.

Several additional predictors of HIV/AIDS knowledge can be identified within existing literature. Inungu et al. (2009) discussed the significance of school as a predictive source for individual levels of HIV/AIDS knowledge; therefore, it is essential to understand the implications a sexual education program can have on its students within a specific school system. The Flint Community Schools require completion of a sexual education course by the end of one's sophomore year. This mandatory course aims to develop lifelong attitudes and perspectives among youth by covering information on safer sexual behaviors, the risks of unsafe sexual behaviors, STI contraction, and safe relationships (C. George, personal communication, October 7, 2013). Although the sexual education curriculum in the Flint Community Schools intends to provide its students with a comprehensive education, it is important to recognize that Flint is a low-income school district. Typically low-income school districts face hardships such as low funding, limited access to resources, and difficulties hiring qualified instructors (Darling-Hammond, 2010). Consideration of

disadvantages within a prevention program is crucial due to the ways in which these challenges impact education, knowledge retention, and health outcomes. It has been shown that HIV/AIDS knowledge among high-income youth is greater than said knowledge level amid low-income youth (Ebrahim et al., 2001). In summary, the context of a sexual education program within one's school, as well as individual socioeconomic status appear to have vital implications in predicting one's HIV/AIDS knowledge level. The results from the current study failed to display familiarity with someone affected by HIV/AIDS as a significant predictors of one's HIV/AIDS knowledge; therefore, these predictors (quality of one's sexual education and one's socioeconomic status) should be future investigated. Said factors may or may not be integrated and act simultaneously to distinguish how much one actually knows about HIV/AIDS. More research is recommended in order to effectively determine this relationship.

Another predictor of adolescent HIV/AIDS knowledge appears to be sexual experience. Individuals who claimed to be more sexually experienced scored significantly higher on an administered HIV/AIDS knowledge questionnaire (Swenson et al., 2010); however, very few studies investigate the effects sexual experience has on adolescent HIV/AIDS knowledge; therefore, this area merits further exploration (Archibald et al., 2001). Overall, investigation to determine specific predictors of HIV/AIDS knowledge should be continued and is suggested for future research. This area is important due to current findings on the role of HIV/AIDS knowledge in determining STI outcomes as will be discussed extensively later on. In short, identification of factors that influence adolescent HIV/AIDS knowledge can be manipulated in order to increase this knowledge level among youth and potentially reduce one's chances of future STI contraction.

The current study hypothesized that higher HIV/AIDS knowledge levels would be correlated with safer sexual behaviors. The results supported this hypothesis and

demonstrated a significant relationship between HIV/AIDS knowledge and risky sexual behavior. Findings showed HIV/AIDS knowledge is positively associated with more frequent condom use for current sexual involvement, but has no implications on future condom use. In addition, an individual's HIV/AIDS knowledge level appeared to be marginally related to the number of sexual partners one engages with. This association indicates a higher level of HIV/AIDS knowledge is correlated with a fewer number of sexual partners. Although significant findings supported the initial hypothesis by demonstrating that greater HIV/AIDS knowledge is related to current safer sexual behavior, these findings did not hold true for future sexual behavior. Instead, for future sexual behavior, the results tended to support literature stating that adolescences are inconsistent when translating HIV/AIDS knowledge into consistent safer sexual practices (Anastasi et al., 1999; Bachanas et al., 2002; Bazargan et al., 2000).

The above results showed that adolescent HIV/AIDS knowledge is important in discussing current sexual activity, but as time passes, this knowledge level becomes less significant. Factors that cause HIV/AIDS knowledge to be less significant in the association between knowledge possessed and future sexual behaviors should be investigated. Potentially, over time, individuals forget key aspects regarding safer sexual practices, and thus, sexual behaviors are engaged in years later without reflection of previous attained knowledge. In addition, higher rates of drug and alcohol use are present among older individuals (Cooper, 2002) and these influence are likely to be associated with unsafe sexual behaviors (Bryan et al., 2012; Scott-Sheldon et al., 2010). Overall, this suggests, that for STI and HIV/AIDS intervention programs to be effective, education aiming to elevate individual HIV/AIDS knowledge needs to be continued, because this knowledge is associated with current sexual behaviors.

The next hypothesis addressed personal perceived risk to determine whether or not it would adopt a crucial mediator role between HIV/AIDS knowledge and engagement in risky sexual behaviors. The results did not display a relationship between an individual's personal perceived risk and level of HIV/AIDS knowledge. These results are similar to those shown by Demmer and Careleo (2001) as they actually discovered HIV/AIDS knowledge tends to have a negative correlation with one's perception of vulnerability for personal HIV contraction. In addition, this finding suggests, perhaps, personal perceived risk is related to factors other than adolescent HIV/AIDS knowledge. For instance, Loffredo, and Opt (2004) stated that one's perception of personal vulnerability for the contraction of HIV was related to acquaintance with one who tested positively for HIV, had been diagnosed with AIDS, or had died due to AIDS. Finally, the current study demonstrates personal perceived risk is associated with factors other than one's level of HIV/AIDS knowledge.

Findings within the current study did not exhibit consistency with the health belief model or the prediction that hypothesized individuals, who see themselves to be at 'high risk' for undesired outcomes, would be less likely to engage in risky behaviors. In contrast, the results suggested a positive association between one's personal perceived risk and the number of sexual partners one has. Overall, it can be noted that individuals who engaged in sexual activity with a greater number of partners possessed an elevated risk perception of personal HIV contraction. These findings support literature stating youth, in general, appear to engage with risky sexual behavior regardless of their level of personal perceived risk (Inungu et al., 2009; Lollis et al., 1996); however, interestingly, the current study demonstrated a positive relationship between individuals who have a higher personal perceived risk and more frequent condom use during sexual activity. It can be inferred from these findings that individuals who view themselves at high risk for a negative sexual outcomes still engage in behavior that could potentially result in undesired outcomes but do

so with a more cautious approach. The relationships noted above were identified for adolescent current sexual behavior and appeared to have no implications for engagement in future risky sexual behavior. Overall, the results indicated personal perceived risk does not assume a mediating role between adolescent HIV/AIDS knowledge level and engagement in risky sexual behavior.

Overall, it was predicted that STI outcomes could be expected based upon the following predictor variables: HIV/AIDS knowledge, personal perceived risk of the contraction of HIV, risky sexual behavior, and gender. The results displayed a significant difference on the mean HIV/AIDS knowledge scale for individuals who indicated the presence of an STI and those who did not indicate the presence of an STI; individuals who did not indicate presence of an STI scored higher, on average, on the assessed knowledge scale. This important finding suggests HIV/AIDS knowledge during adolescence has important implications on later STI contraction and aligns with previous literature, which states knowledge leads to engagement in safer sexual practices (Swenson et al., 2010). This finding adds to existing research by displaying the long-term sexual health effects of adolescent HIV/AIDS knowledge. When looking at the bigger picture, these results suggest that education and knowledge play an important role in sexual health outcomes. This indicates focusing intervention programs on the acquisition of knowledge will be effective in preventing negative sexual health outcomes.

Findings of the current study showed supported the overall model, which is displayed in figure 1. In other words, STI outcomes can be predicted by HIV/AIDS knowledge, personal perceived risk, sexual behavior, and gender. The number of sexual partners one engages with, individual HIV/AIDS knowledge level, and one's gender were significant predictors within the model. Therefore, these three factors are important in predicting future STI outcomes amid youth. The findings from the crosstabulation analysis reiterated the fact



that females are indeed more likely to indicate the presence of an STI. However, interestingly, the results indicated this difference in gendered STI outcomes was not due to gendered differences of personal perceived risk or gendered differences in HIV/AIDS knowledge but instead due to an alternate unknown factor. The specific model utilized is unique to the current study because few previous studies incorporate gendered differences in personal perceived risk or HIV/AIDS knowledge as predictors of STI outcomes. That being stated, perhaps females possess a higher level of personal perceived risk and greater HIV/AIDS knowledge when compared to males, but this is insignificant when predicting STI outcomes amid adolescents. Overall, the results show that gender plays a crucial role in predicting STI outcomes but is not dependent upon personal perceived risk or HIV/AIDS knowledge. Therefore, future research should focus on recognition of alternative differences between genders that potentially impact STI outcomes among adolescents.

### **Limitations**

There are several limitations within the current study that require consideration when interpreting the results. First, the sample for this study included African American adolescents who were considered 'at risk' based upon low school attainment. Therefore, findings displayed by this study cannot be directly applied to the greater population of African American adolescents; however, according to Zimmerman, Caldwell, and Bernat (2002), the range of GPA's had a normal distribution by the participant's senior year of high school. Additionally, it is important to recognize findings within the present study should not be assumed to be consistent across racial lines for all adolescents. Regardless, the findings of this study are important for African American due to elevated HIV/AIDS infection rates among this racial group. Yet, for a future direction, it is suggested that research focuses on the implications of HIV/AIDS knowledge on current and future behaviors, as well as STI outcomes among adolescents who identify with alternate racial groups.

It must also be noted within the STI outcome variable, the quantity of participants who indicated the presence of an STI was small (n= 15). This small sample size for the outcome variable could potentially be problematic when utilizing logistic regression equations, because this form of analysis predicts the likelihood of outcomes occurring within the binary of responses to said outcomes based upon existing individual responses to predictive variables and their such outcomes. Significant results were found despite the small sample size, which further suggests that amid a larger population the findings may be even more definitive.

### **Implications**

Despite exiting limitations, this study displays the importance of HIV/AIDS knowledge among adolescents due to its impacts on future STI contraction. It helps to fill current gaps regarding the impact of HIV/AIDS knowledge on sexual behaviors and sexual health outcomes. It must be noted that sexual education programs intending to prevent the transmission of HIV should incorporate a curriculum to enhance HIV/AIDS knowledge as a method of preventing future contraction of an STI. This knowledge during adolescence is important in predicting STI outcomes and safer sexual practices. However, to be most effective, education should be continued and reoccurring to encourage safer sexual behaviors.

In addition, the results from this study show that regardless of the level of one's personal perceived risk for HIV contraction, engagement in sexual activities with multiple partners still occurs; therefore an important focus of HIV/AIDS as well as STI prevention and intervention programs aimed at youth should highlight the importance of condom use when engaging in sexual activity. The results suggest that education that promotes condom use among adolescents will be more effective than trying dictate the number of sexual partners one engages with.

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Figure 1

*Conceptual Model Representing the Current Study*

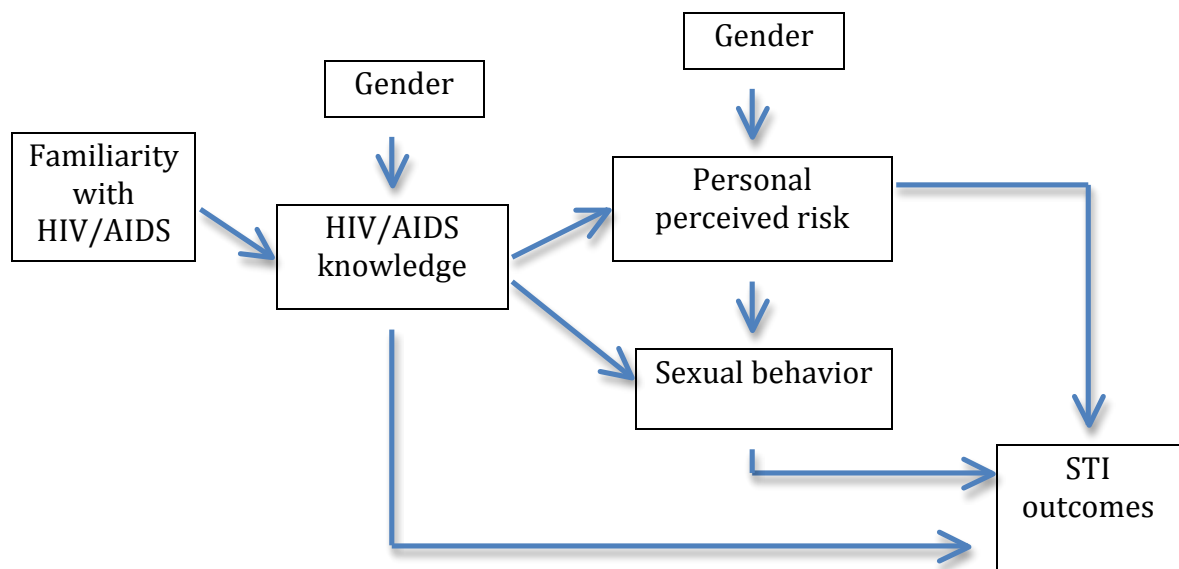




Table 1

*Mean and Standard Deviation of HIV/AIDS Knowledge, Perceived Risk, Risky Sexual Behaviors, and Presence of an STI*

Variables	Males		Females	
	<i>n</i>	<i>M(SD)</i>	<i>n</i>	<i>M(SD)</i>
HIV/AIDS Knowledge	280	3.13(0.46)	316	3.09(0.50)
Perceived Risk	155	0.07(0.64)	163	-0.15(0.64)
Condom Use (W2)	229	4.46(0.99)	211	3.99(1.36)
Condom Use (W3)	273	3.36(2.09)	314	2.73(2.04)
Condom Use (W4)	208	4.12(1.14)	236	3.50(1.42)
Condom Use (W8)	169	3.70(1.56)	209	3.13(1.68)
Number of Partners (W2)	225	3.58(3.68)	213	2.08(1.76)
Number of Partners (W3)	203	3.86(3.92)	233	2.19(2.41)
Number of Partners (W4)	199	3.19(2.81)	233	1.87(1.55)
Number of Partners (W8)	172	2.81(4.93)	229	1.54(0.97)
Presence of an STI	335	1.92(0.28)	346	1.86(0.35)

Table 2

*t*-test Results Comparing Individuals Familiar with HIV and/or AIDS and Individuals Not Familiar with HIV/AIDS on Individual's HIV/AIDS Knowledge Level

Familiar	<i>n</i>	Mean	SD	<i>t</i> -crit	<i>df</i>	<i>P</i>	Decision
						(one-tailed)	
Yes	108	3.09	0.45	-.302	588	.382	Reject
No	482	3.09	0.49				

Note. \* $p < .05$ , one tailed.

Table 3

*The Relationship Between HIV/AIDS Knowledge and Risky Sexual Behaviors*

Measure	HIV/AIDS knowledge	
	<i>r</i>	<i>p</i> (one-tailed)
Condom Use (W2)	.11	.02*
Condom Use (W3)	.07	.06+
Condom Use (W4)	.06	.13
Condom Use (W8)	.04	.21
Number of Partners (W2)	-.80	.06+
Number of Partners (W3)	.01	.40
Number of Partners (W4)	.00	.49
Number of Partners (W8)	-.43	.21

*Note.* + $p < .1$ , one tailed. \* $p < .05$ , one tailed.

Table 4

*The Relationship Between HIV/AIDS Knowledge and Personal Perceived Risk of HIV  
Contraction*

Measure	HIV/AIDS knowledge	
	<i>r</i>	<i>p</i> (one-tailed)
Condom Use (W2)	.07	.16
Condom Use (W3)	.28	.00**
Condom Use (W4)	-.01	.44
Condom Use (W8)	.01	.47
Number of Partners (W2)	.15	.02*
Number of Partners (W3)	.05	.23
Number of Partners (W4)	.13	.03*
Number of Partners (W8)	.09	.11

*Note.* \* $p < .05$ , one-tailed. \*\* $p < .01$ , one-tailed.

Table 5

*t*-test Results Comparing Presence of an STI and No Presence of an STI on Individual's HIV/AIDS Knowledge Level

Familiar	n	Mean	SD	<i>t</i> -crit	<i>df</i>	<i>p</i>	Decision
						(One-tailed)	
Yes	72	3.00	0.48	-2.24	594	.01*	Accept
No	524	3.13	0.48				

Note. \* $p < .05$ , one-tailed.

Table 6

*Logistic Regression Analysis of STI Outcomes Based Upon HIV/AIDS Knowledge, Personal Perceived Risk and Risky Sexual Behavior*

Predictor	$\beta$	SE $\beta$	Wald's $X^2$ ( $df = 1$ )	$p$	$e^{\hat{\beta}}$ ( <i>odds ratio</i> )
Constant	.81	1.95	.17	.68	2.25
Knowledge	1.07	.52	4.16	.04*	2.92
Perceived Risk	-.37	.40	.83	.36	.69
Condom Use	.03	.18	.03	.87	1.03
Number of Partners	-.22	.08	8.21	.00**	.81
Gender	-1.10	.54	4.24	.04*	.33

*Note.* \* $p < .05$ , one-tailed. \*\* $p < .01$ , one-tailed.

Table 7

*Crosstabulation of Gender and STI Outcomes*

Gender	STI Outcome		Total
	Yes	No	
Male	28	307	335
Female	50	296	346
Total	78	603	681