

# **COLLEGE STUDENTS IN NIGERIA UNDERESTIMATE THEIR RISK OF CONTRACTING HIV/AIDS INFECTION**

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## **Abstract**

**Objectives:** This study aimed at assessing the perceptions of personal risk of acquiring HIV/AIDS infection among students of selected tertiary institutions in Osun State, Nigeria and determining the correlates of perceptions of personal risk of infection.

**Methods:** The study employed a cross-sectional descriptive design. An interviewer-administered questionnaire was applied to the 405 study participants and correlates of perceptions of personal risk of HIV infection were evaluated using multiple logistic regression analysis, confidence intervals and odd ratios.

**Results:** Only 15% of the students perceived themselves to be at moderate-to-high risk of acquiring HIV infection compared with 85% who perceived themselves to be at little or no risk. Investigators' assessment of risk status of the participants revealed that 77% of the participants were actually at high risk of infection compared with only 33% that were at low risk. The sensitivity, specificity and predictive value negative of the students' self perception of personal risk compared with their assessed risk were 7%, 58% and 16% respectively, with a Kappa statistic of 0.178. The only significant correlate of self perception of personal risk was recent symptoms of sexually transmitted infections (STIs).

**Conclusions:** College students exhibited high rates of HIV risk indicators but low levels of perceived personal risk of infection in favour of an "*optimism bias*". This has implications for HIV/AIDS control in Nigeria.

## **Introduction**

The Nigerian HIV/AIDS epidemic has crossed into the explosive phase, already advancing well beyond high risk groups and into the general population. The official adult prevalence rate is about 5%, but unofficial estimates range as high as 10% - which represents about 4-6 million infections. Infections are most numerous among men aged 20 to 24 years, but some experts caution that infection rates are rising quickly in young women<sup>1</sup>. While HIV/AIDS education programs for schools and youth groups have proliferated in recent years, the scientific foundation for such programs is quite limited and an evaluation of their impact has been rare, in both industrialized and developing countries<sup>2</sup>. Identification of the correlates of perceptions of personal risk (threat) of contracting HIV infection among young people is likely to better inform a behaviour change communication intervention more than a stopgap education program that is not based on empirical evidence of the perspectives of the youth.

The construct of perceived threat is an important component in behavioural theories that are applied to understanding and changing sexual risk behaviours that lead to sexually transmitted infections including HIV/AIDS<sup>3</sup>. For example, the Information-Motivation-Behavioural Skills model, as applied to HIV infection, posits that the perceived threat of HIV infection contributes to individual motivation to adopt protective behaviour<sup>4</sup>. However, the perceived threat is still an understudied construct in the field of HIV infection and sexually transmitted infections (STIs)<sup>5-6</sup>. Perceived threat has been conceptualized as a product of perceived risk and perceived severity relative to a given disease or event<sup>7</sup>. Adolescents and young people are likely to underestimate both the severity and their risk of adverse health outcomes<sup>5,8-10</sup>. This underestimation may, in part, be a mental defense mechanism. The tendency to systematically underestimate personal risk

has been termed “optimism bias”<sup>7</sup>. Quadrel et al<sup>11</sup> found that high school students perceived themselves to be at less risk compared with peers for alcoholism and unwanted pregnancy. Moore and Rosenthal found that college students are optimistically biased in their perceptions of relative risk for STIs and AIDS.<sup>12</sup>

Previous studies have however varied widely in their measurement of perceived threat, with constructs such as perceived vulnerability, susceptibility, and worry being assessed by researchers<sup>6</sup>. An important aspect of perceived threat is whether the perception of threat creates worry (an indication of dissonance). Dissonance may be a strong motivating factor for behaviour change, particularly if the individual perceives control over the risk behaviour<sup>13</sup>. Alternatively, intellectual perceptions of susceptibility without feelings of dissonance are less likely to motivate behaviour change. Few published data exist regarding correlates of young peoples’ STI and HIV worry. Some of the studies recruited subjects from STI and reproductive health clinics, and thus, potentially limited the generalizability of the findings. Little is therefore known about the determinants of perceptions of personal risk for HIV/AIDS and STIs among young people generally. These may be related to their past condom use, their number of lifetime sexual partners and their beliefs that they can prevent and or recognize individuals who are infected with STI or HIV/AIDS<sup>12,14</sup>.

This study was conducted among undergraduate students of selected tertiary educational institutions in Osun State of Nigeria with the aim of assessing the self perceptions of risks for acquiring HIV infection among the general population of young people, determining the validity of their perceived risk status and investigating the reproductive health correlates of self perceptions of risks of HIV infection among the respondents.

## **Methods**

**Study location:** Study was carried out in two tertiary educational institutions located in Ile-Ife and Ilesa in Osun State, Southwest, Nigeria. One was a State College of Education with a student enrollment of about 5,000 and the other was a private polytechnic with a student enrollment of about 4,000. Students of both institutions make private arrangements for accommodation as the schools are non-residential.

**Study design:** The study employed a cross-sectional descriptive design.

**Sample size determination:** Sample size was estimated from the Computer Programs for Epidemiologists (PEPI) version 3.01 by employing the sample size formula for estimation of a single proportion as described by Armitage and Berry and cited in Abramson and Gahlinger (1999)<sup>15</sup>. Assuming a 95% level of confidence, an estimate of true proportion of perception of personal risk of HIV among young people of 50% (no previous estimate found in literature), and a maximum acceptable difference from true proportion of 5%, the minimum sample size estimated was 385. This was eventually upgraded to 400, but 405 participants were eventually interviewed.

**Sampling technique:** This was by multi-stage sampling procedure. The sampling frame consisted of all 6 tertiary educational institutions in the state. Two of these were randomly selected by balloting. From each selected institution, two faculties were randomly selected from the lists of constituent faculties. From each selected faculty, two departments were randomly selected from the list of constituent departments. From each selected department, two years of study were randomly selected and all students in each selected year of study were interviewed in a classroom setting.

**Data collection methods:** A semi-structured questionnaire was applied to each participating student face-to-face by final year medical students who were recruited and trained on the instrument. The questionnaire specifically asked questions on respondents' biodata, their perceptions of HIV/AIDS and knowledge of the modes of transmission, the sexual practices and indicators of risks of contracting HIV. The ethics and research committee of the local university teaching hospital approved the research protocol and study instruments. A written consent was obtained from each participating student prior to data collection.

**Data analysis:** Data were analyzed with the use of the SPSS statistical software package. Descriptive statistics was used to present respondents' demographic variables, reproductive health history, selected indicators of risk of acquiring HIV and perceptions of HIV risk status. We conducted multiple logistic regression analyses to examine the odds of perceived susceptibility to acquiring HIV infection that was associated with selected indicators of risk for HIV infection namely: *recent history of unprotected sex, history of multiple sexual partners, past history of STIs, recent symptoms of STIs*. The indicators of risk used in this study were similar to those described by Ethier et al. for sexually transmitted infections<sup>16</sup>. We calculated the validity (sensitivity, specificity and predictive value negative) of the respondents' perceived risk statuses against the assessed risks and the degree of agreement (Kappa statistic) with the investigators' assessment of risk.

## **OUTCOME MEASURES**

### ***Unprotected sex***

Participants were categorized as engaging in unprotected sex in the month preceding the survey if their reported episodes of condom use were less than 100%.

### ***Lifetime sexual partners***

Participants were categorized as having  $\geq 4$  or  $< 4$  partners based on reported lifetime sexual partners. This cut off is reported to be a standard indication of high numbers of sexual partners<sup>16</sup>.

### ***Past history of STI***

Participants were categorized as having a previous STI if they ever reported a health facility/home made diagnosis of gonorrhoea, syphilis, trichomonas, genital herpes, genital warts, chlamydia or human papillomavirus (HPV).

### ***Recent symptoms of STI***

Participants were categorized as having a recent symptom of STI if they reported urethral discharge, genital sores, genital bumps/swellings, genital rash, pain/discomfort on urination or other related symptoms in the 6 months preceding the survey.

### ***Perceived risk of HIV***

Study participants rated their likelihood that they could contract HIV infection now or in the near future using a Likert-like scale of “no risk”, “little risk”, “moderate risk” and “high risk”. The ratings were dichotomized into categories of “**little or no risk**” and “**moderate-to-risk**”. This was done in order to ascertain if participants underestimated their risk of HIV infection or not, in relation to selected HIV risk indicators. Participants were also asked to compare their perceived risk status with those of their peers on a 5-item scale of much less risk, less risk, same risk, more risk and much more risk in order to ascertain if there was any “*optimism bias*”<sup>7</sup>

### ***Assessed risk of HIV***

To categorize the participants' risks of acquiring HIV as assessed by the investigators, we created a composite score that summarized the status of each respondent using the responses to the selected risk indicators for HIV infection. This measure assessed participants' risks on a scale of "high" or "low" and was used as the "gold standard" against which to compare the respondents' perceived risk statuses. Responses to each of 4 risk indicators were scored on a scale of 0-2. Zero when the risk indicator was absent; 1 when participants had less than four lifetime sexual partners, a positive history of unprotected sex, one recent STI symptom or a previous history of STI; 2 when participants had four or more lifetime sexual partners, two or more recent STI symptoms or repeated history of STIs. Scores were computed for each respondent; total and mean scores were also computed for all respondents. Those whose scores were more than the mean score were categorized as having a high risk of HIV infection while those whose scores were less than or equal to the mean score were categorized as having a low risk of infection.

### **Results**

Respondents consisted of 252 males (62.2%) and 153 females (37.8%), with an age range of 15 to 25 years and a mean age of  $19.2 \pm 0.6$  years. They were nearly all (97.2%) single. A hundred and twenty-two of them (30.1%) reported a past history of at least one Sexually Transmitted Infection (STI); 243 (60.0%) had a history multiple sexual partners, and 83(20.5%) had at least 4 lifetime sexual partners. One hundred and sixty-five (40.7%) respondents reported a history of unprotected sexual intercourse in the month preceding the survey and about a quarter (101 respondents) of them reported symptoms of STIs in the 6 months preceding the survey. However, only 5% of the students reported having



ever had a voluntary counseling and testing (VCT) for HIV. Eighty three percent of them correctly perceived HIV as a sexually transmitted infection and 78% reported that HIV may be spread through contact with blood and other body fluids. However, only 44% of the students reported the mother-to-child route as a possible pathway of transmission of HIV.

Only 15% of the students perceived themselves to be at moderate-to-high risk of contracting HIV infection in the near future. A majority (85%) of them perceived themselves to be at little or no risk. Furthermore, only 32% of the students perceived their peers to have same or lesser risk of HIV infection as them, while 68% perceived their peers to have a higher risk of HIV infection compared with self. The investigators' assessment of students' risk of HIV infection revealed that 77% of the students were categorized to have a high risk of contracting the infection while only 23% of them were categorized to have a low risk of infection. A comparison of the students' perceived risk status with the investigators' assessed risk status revealed that the sensitivity of the students' self risk classification was only 7% with a specificity of 58% and predictive value negative of 16%; comparability of perceived and assessed risks gave a Kappa statistic of 0.178 (Table 1). Table 2 presents the relationship between the perceived susceptibility of the students to HIV and the prevalence of reported HIV risk indicators using odd ratios and 95% confidence intervals from logistic regression analysis. The only variable that significantly influenced respondents' perceived susceptibility to HIV infection was recent symptoms of STIs; even then, only 23% of students who had recent symptoms of STIs perceived themselves to have a moderate-to-high risk of contracting HIV. Other HIV risk indicators such as recent history of unprotected sex, past history of STI and having multiple sexual partners did not significantly influence respondents' perceived susceptibility to HIV infection.

## **Discussion**

Young people are at high risk for negative health outcomes associated with unprotected sexual intercourse, including infection with the Human Immunodeficiency Virus (HIV).<sup>18</sup> Accurate assessment of personal risk and making the connection between behaviour and susceptibility to infection are important first steps in preventing disease. In order to perceive themselves as susceptible, young people should recognize a number of indicators of risk of disease. A majority of the respondents in this study perceived themselves to be at “little or no” risk of contracting HIV/AIDS despite a high prevalence of HIV risk indicators among them. Furthermore, a greater proportion perceived themselves to be at lesser risk of infection compared with their peers. This “*Optimism bias*” which has also been reported among adolescent college students elsewhere<sup>12</sup> has grave implications for the control of HIV infection in Nigeria, as young people aged less than 25 years have the highest sero-prevalence rate of infection and harbour over 60% of existing cases of HIV/AIDS in the country<sup>19</sup>.

As disturbing as these findings may appear, however, they are not isolated among the population of Nigerians. A recent national health survey in the country<sup>20</sup> found that while eight out of ten adults had heard of HIV/AIDS, their knowledge of HIV transmission was often superficial. Only two out of ten had an accurate understanding of how the virus is transmitted while as many as seven out of ten believed they were not at risk of contracting the disease. Many Nigerians attribute illness and death to the machinations of nefarious forces, as opposed to biomedical factors<sup>21</sup>. Even among relatively well-educated individuals such as the present study participants, risk of HIV infection is often viewed as unrelated to behavioral practices. As a result, many people do not understand the importance of such prevention strategies as delayed sexual initiation, reduction in numbers of sexual partners, regular use of

condoms, and being tested for HIV in the control of the infection. It was therefore not surprising that college students who exhibited such high-risk sexual behaviours still perceived themselves to be at little or no risk of HIV infection.

While the gold-standard against which participants' perceived risk status was compared in this study was not the incidence of HIV in the population, and therefore, not faultless, it was, however, a scholarly and statistical attempt at using factors proven to be important in the judgment of risk for HIV (for example, condom use, number of sexual partners) as proxies for "confirmed risk status" in the circumstance of the cross-sectional design of the study. Going by this standard, and taking a self perception of "*moderate to high*" risk of infection and "*little or no*" risk of infection as being compatible with "high assessed risk" and "low assessed risk" respectively, a 7% sensitivity and a 58% specificity of the college students' perceptions of their susceptibility to HIV infection in the near future against their assessed risk circumstances were quite weak and inaccurate. Furthermore, the negative predictive value of the students' risk perceptions versus the assessed risk circumstances was only 16% and the Kappa statistic was 0.178. This literally translates into the fact that the probability of a student who perceives himself/herself to be at little or no risk of HIV infection being truly at low risk is only 16%. This, together with the Kappa statistic, confirms a gross mismatch between perceived and assessed risk status for HIV/AIDS among the college students and further buttresses the "*optimism bias*" of the college students.

The only risk indicator that was significantly associated with some perceived measure of risk of contracting HIV infection among participants was recent symptoms of STIs in the six months preceding the survey. All the other indicators of risk such as inconsistent use of

condom during sexual intercourse, multiple sexual partners and past history of STIs, though reported by the students, did not significantly influence their perceptions of susceptibility to HIV/AIDS. Other authors<sup>7</sup> have posited the “*absent-exempt*” hypothesis as a likely explanation for this situation; that is, young people may perceive HIV infection as an unlikely event for them or that they are exempted from the infection based on their perceived absence of infection despite repeated episodes of risk behaviour. If this hypothesis were true for the present study participants, it would be an unfortunate assumption on their part as only 5% of them had ever undergone VCT and the others must either be assuming that they are negative because they are not currently ill or that they should be able know if they are HIV positive, even without screening. In the same line of reasoning, the burden/discomfort associated with recent symptoms of STI may be the motivator for this risk indicator being perceived as one that makes participants vulnerable to HIV/AIDS, more than the risky sexual behaviours that predispose people to the STI symptom itself, as these behaviours are not associated with any discomfort/burden on the part of the individual.

### **Conclusion**

College students exhibited high rates of HIV risk indicators but low levels of perceived personal risk of infection with HIV/AIDS in favour of an “*optimism bias*”. Furthermore, factors proven to be important in the judgment of risk of HIV infection (for example, condom use, and number of sexual partners) were not significant correlates of students’ perceived measure of risk for HIV infection. These barriers have to be overcome if HIV/AIDS control efforts in the country, especially among young people, must meet their set objectives and be delivered effectively.

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**Table1. Relationship between Nigerian college students' self perceived susceptibility and their assessed susceptibility to HIV infection by the investigators**

<b>Perceived Risk</b>	<b>Assessed Risk</b>		<b>Total</b>
	High	Low	
Moderate- High	22	39	61 (15%)
Little or None	290	54	344 (85%)
<b>Total</b>	312 (77%)	93 (23%)	405 (100%)

**Sensitivity of perceived risk** =  $22/312 \times 100 = 7\%$

**Specificity of perceived risk** =  $54/93 \times 100 = 58\%$

**Predictive value negative of perceived risk** =  $54/344 \times 100 = 16\%$

**Kappa Statistic** =  $\frac{(22 + 54/405) - (47 + 79/405)}{1 - (47 + 79)/405} = -0.178$

**Table 2. Odd ratios from logistic regression analyses assessing the odds of Nigerian college students' self perceived susceptibility to HIV infection against selected HIV risk indicators**

HIV risk indicators		Perceived Susceptibility		OR (95% CI), P value
		Little or No risk of infection No (%)	Moderate to High risk of infection No (%)	
Past history of STI (n=405)	Present	101 (82.8)	21 (17.2)	<i>1.11</i> <i>(0.48-2.67),</i> <i>0.42</i>
	Absent	243 (85.9)	40 (14.1)	
Recent symptoms of STI (n=405)	Present	78 (77.2)	23 (22.8)	<i>2.95</i> <i>(1.22-4.35)</i> <i>0.03</i>
	Absent	266 (87.5)	38 (12.5)	
Recent history of unprotected sex (n=405)	Present	134 (81.2)	31 (18.8)	<i>1.45</i> <i>(0.56- 3.10)</i> <i>0.19</i>
	Absent	210 (87.5)	30 (12.5)	
Lifetime number of sexual partners (n=405)	≥4	66 (79.5)	17 (20.5)	<i>1.96</i> <i>(0.76 -3.25)</i> <i>0.10</i>
	<4	278 (86.3)	44 (13.7)	
<b>Total</b>		<b>344 (85%)</b>	<b>61 (15%)</b>	