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HIV Risk and Prevention Behaviors, Intentions, Perceptions and Knowledge among Youth in Goa, India

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Summary

In order to examine the association between HIV/AIDS knowledge and perceptions, and risk intentions and behaviors among adolescents in Goa, India, cross-sectional data from 942 youth were collected and assessed. The prevalence rates in past 6 months for fighting, smoking, drinking, and drug use were 16.5%, 3.8%, 17.8%, and 1.1% respectively; 5.2% acknowledged ever having engaged in sex. Prior risk involvement was significantly correlated with future risk intention (OR: 9.7~19.7), and those involved in one risk behavior were more likely to engage in other risk behaviors (OR: 1.3~23.5). The findings suggest the importance of targeted interventions for youth engaging or intending to engage in risk behaviors and universal interventions regarding basic facts and skills for all youth in Goa.

Keywords

Risk behaviors; Intention; Perception; Knowledge; HIV/AIDS; Youth; Goa; India

INTRODUCTION

Since the year 2000, the percentage of persons living with HIV has stabilized world wide. While HIV prevalence has decreased in some countries, increases are occurring in other countries, including several in Asia [1]. India is one of the countries of concern, where an estimated 2.5 million persons are currently living with HIV or AIDS [2]. Although this figure is lower than earlier estimates by UNAIDS (with international estimates as high as 5.7 million infected persons[3]), even these revised numbers do not justify complacency.

Nationally the HIV prevalence in India was estimated to be 0.36% in 2006. However there are states in which the concentration is substantially higher (Manipur and Karnatak with HIV prevalence of 1.13% and 0.97% respectively) and states with relatively low rates (Uttar

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Pradesh and Tamil Nadu at 0.07% and 0.34% respectively). In addition, there are substantial pockets of high and low infection within the states and throughout the nation [4].

In India, youth ages 15 to 24 years account for approximately one-third of persons infected with HIV and 35% of new infections[5, 6]. Despite the prominence of young adults in the HIV epidemic, prevention research regarding adolescents has been scant.

The HIV/AIDS epidemic in India is largely confined to high risk groups (commercial sex workers and their partners and intravenous drug users). Reports of sexual initiation with commercial sex workers vary widely, but a large proportion of unmarried adolescent and college aged males report having had sex with a commercial sex worker and with older women [7]. Condom use is reported to be rare, with the vast majority reporting unprotected sex at some time [8]. In one rural area with high reported rates of sex with commercial sex workers, 80% of sexually active males reported never having used a condom [9]. These gender-based sexual patterns are similar to other areas of Asia, and suggest that young men engaged in unprotected sexual behaviors are a bridging population between groups at higher risk of acquiring HIV/AIDS (sexual workers) and the general population[10–13]

Despite the availability of more effective therapies for HIV/AIDS, the HIV epidemic cannot be controlled without preventing new infections [1]. Critical to prevention efforts is an adequate knowledge base and theory-based effective behavioral prevention programs that work with all populations, not simply those at high risk at a given point in time. Further, such efforts need to be continuing; there is no reason to believe that a behavioral prevention program at a single point in time will remain effective as individuals mature and the epidemic changes [1, 14].

Protection Motivation Theory (PMT), a social cognitive theory, has been widely used to guide intervention development regarding multiple health threats including HIV/AIDS[15–21]. PMT envisions environmental and personal factors combining to pose a potential threat. Consideration of a maladaptive response (e.g., unprotected sex) is mediated by a balance between rewards (***intrinsic* rewards,** e.g., favorable attitudes or feelings toward sex, and ***extrinsic rewards,*** *e.g., peer influences*) accompanying the behavior and the potential adverse effects of participating in the maladaptive behavior including perceived ***severity of the possible adverse effects*** and perceived personal ***vulnerability*** to these adverse effects. An adaptive response (engaging in a safe behavior such as remaining abstinent or using a condom) is mediated by balancing the ***response efficacy*** (perceived likelihood that the action will reduce the threat) and **self-efficacy** (belief that the individual can complete the adaptive response) and the ***response cost*** (barriers or inconveniences) of completing the adaptive response (performing the safe behavior). These two appraisal pathways to combine to form ***protection motivation*** (intention) to respond to a potential threat in either an adaptive (protective behavior) or maladaptive (risk behavior) manner [22, 23]. PMT, a social cognitive theory, was developed in Western countries and its appropriateness has only been assessed in a limited number of non-Western countries. Although our own work has suggested its appropriateness in several different settings, including China [24, 25], Vietnam [26], and The Bahamas [27], it is important to assess the appropriateness of PMT specifically in the Indian context.

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Given the emerging importance of India in the global HIV epidemic, the significance of adolescents and young adults in the India epidemic, the lack of information on knowledge, perceptions and behaviors regarding HIV risk and preventive behaviors among Indian youth is concerning. Therefore, a research collaborative between US adolescent HIV researchers and Indian public health representatives undertook the current study designed to explore these issues among adolescents living in Goa, India, in preparation for developing a school-based curriculum

METHODS

STUDY SITE

The estimated HIV prevalence of 0.73% in the State of Goa places it among the highest prevalence quintile of Indian states [4]. Goa is reported to have the second highest HIV prevalence among individuals testing positive for a sexually transmitted disease [28]. Thus, HIV/AIDS is of great concern to public health officials in Goa, but because of its small population in comparison to the other states in India and the fact that it is not the highest risk state, extensive research regarding the epidemic has not been conducted in Goa. Moreover, to date, there is no special curriculum (school time and teaching materials) or intervention strategy in Goa targeting adolescent HIV/AIDS risk prevention aimed in the state of Goa (personal communication: Dr. RajendraTamba, Chief Epidemiologist, Directorate of Health Services, Goa).

Goa is divided into two areas, North and South Goa. North Goa, the site of this project, includes 6 cities with 49 higher secondary schools covering approximately 13,280 students. North Goa consists of urban, semi-urban and rural areas whose population includes a wide spectrum of socio-economic status. Given the potential importance of urbanity and/or SES in the global epidemiology of the HIV/AIDS [29], the range of these variables in Goa is of potential interest in understanding the epidemic.

SAMPLING PROCEDURE AND PARTICIPANTS

Participants in the current study included 942 eleventh grade students attending eight higher secondary schools in North Goa. These eight schools were selected from North Goa's 49 higher secondary schools (with 13, 280 students). School selection criteria included willingness to participate and geographic distribution. Three of the eight sampled schools were characterized as rural, three as semi-urban, and two as urban by the school principals.

The study was approved by the Institutional Review Boards of Wayne State University and the Directorate of Health Services, Government of Goa. Youth and parents received an information sheet and were given the opportunity to opt out (passive assent or consent); if either a youth or parent did not wish the youth to participate, the child was not given the questionnaire. Across the eight schools about 5% of youth opted out per the request of the parent, youth or both.

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DATA COLLECTION PROCEDURES

Data was collected by a paper-and-pencil questionnaire in the eight higher secondary schools during school hours in 2008. The questionnaire, the Indian Youth Risk Behavioral Inventory (IYHRBI), had been developed by the research team based on an instrument used by our group in multiple settings across the globe called the Youth Health Risk Behavioral Inventory [30]. The instrument was adapted to the Indian context through focus group discussions and pilot tests of portions of the instrument conducted among 69 youth attending grades 9 and 11 in eight secondary and higher secondary schools. As English is widely spoken in Goa and classes are conducted in English, there was only an English version of the questionnaire.

The questionnaire was administered by trained investigators from India and the US. The questionnaire was handed directly to the youth by the researchers who reassured the youth that the questionnaire was both anonymous and confidential. The students were told they could skip any question(s) they did not wish to answer and/or could discontinue completing the questionnaire at any point in time. One of the investigators read the questionnaire out loud while the students marked their responses on the questionnaires. The investigators were present to explain the question(s) if not understood by a student.

MEASURES

HIV/AIDS Knowledge—The HIV/AIDS knowledge was measured using 23 true/false questions which were from our previous studies in the United States and The Bahamas [27, 30, 31]. The items include: (1) *transmission-knowledge:* e.g., whether HIV can be transmitted through touching, eating, or sharing needles with a person infected with HIV, and whether HIV infection could occur the first time one engaged in sex, if the individual were only having sex with one person, and/or if a condom broke during sex; (2) *prevention knowledge*: e.g., it is a good way to be protected from HIV infection by: using a condom during sex, bathing after sex, abstinence, using plastic wrap, taking birth control pill, keeping in good physical shape, taking a shower after sex, eating a good diet and getting plenty of sleep; (3) *other knowledge*: e.g. “anybody can get AIDS”, “AIDS can be cured if treated early”, “you can tell if someone is not infected with HIV by looking at them”, “a boy does not need to use a condom if he pulls out before ejaculates”, “if a condom breaks while sex, you can get a STD”, and “the AIDS virus doesn’t go through unbroken skin”. The questionnaire also assesses knowledge of other aspects of safe sex: “you can get pregnant the first time you have sex” and “If a condom breaks/bursts while you’re having sex, you can get pregnant”. The number of correct answers on these 23 questions was used as a measurement of HIV/AIDS knowledge (ranging from 0 to 23).

PMT Constructs—PMT perceptions were assessed regarding the behavioral domain of abstinence through seven sub-scales corresponding to the seven PMT constructs (*self-efficacy*, *response-efficacy*, etc. as described in the “Introduction”). The questions assessing each of the PMT constructs had been developed in previous studies conducted in the United States [30] and had been modified for Goa based on feedback from focus group discussions conducted among Indian youth and child health professionals and responses to a pilot test conducted among 75 Goan youth. Seven subscales were derived, each corresponding to one

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of the PMT constructs. The items constituting each of the abstinence sub-scales were measured by five-point Likert scales. The Cronbach α ranged from 0.34 to 0.78 among the Indian youth. According to PMT, higher mean values on self-efficacy, response efficacy, severity, and vulnerability subscales and lower values for intrinsic rewards, extrinsic rewards, and response cost subscales are protective responses. The questions forming the PMT constructs are shown in Figure 1.

Intention to engage in risk behaviors—Although we were principally interested in sexual risk behavior, given the co-variation of risk behaviors [32], we also asked information about intention to engage in other risk behaviors. *Intention to smoke cigarettes* was measured using the question: "How likely is it that you will smoke a cigarette in the next six months?". *Intention to consume alcohol* was measured using the question: "How likely is it that you will drink alcohol in the next six months?". *Intention to engage in sex* was measured using the question: "How likely is it that you will have sex in the next six months?". The possible answers for these questions ranged on a five-point Likert scale from "very likely" to "very unlikely". If the youth answered "very likely" or "likely", the response was coded as "intending (=1)" to engage in the respective risk behavior, otherwise "not intending (=0)".

Risk Behaviors—*Fighting* was assessed using the item: "in the last six months, have you been in a physical fight with a friend". *Smoking cigarettes* was assessed using the item: "in the last six months, have you smoked a cigarette". *Alcohol consumption* was assessed using the item: "in the last six months, have you had a drink of alcohol, beer, with, rum, feni, or liquor". *Drug use* was assessed using the item: "in the last six months, have you used any drugs". *Ever had sex* included either or both vaginal and anal sex at any time during the youth's life.

Demographic Characteristics—These variables include child's age, gender (1 = male, 2 = female), urbanity (rural, semi-urban, urban), and socioeconomic status (SES). SES was assessed through 15 questions regarding belongings owned by the family including running water, glass windows, electricity, more than two bedrooms, telephone, DVD/VCD player, microwave, gas stove, refrigerator, computer, satellite/cable TV, washing machine, stereo system, car, and motorcycle. Counting the number of items owned by the family and/or youth was used as a measurement of SES (ranging from 0 to 15).

STATISTICAL ANALYSIS

Frequency distribution was performed for the variables of gender, urbanity (rural, semi-urban, urban), and SES. Chi-square (for categorical variables) and ANOVA (for continuous variables) were used to examine the differences by gender and urbanity with regard to knowledge, perceptions, intentions and risk behaviors. Adjusted rate or mean was calculated using general linear model (GLM). Odd Ratios (*OR*) was used to study the relationship between PMT perception, intention and risk behavior using logistic regression analysis without/with controlling gender, urbanity, age, SE S. All statistical analyses were conducted using the software SAS version 9.13 (SAS Institute, Cary, NC).

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RESULTS

GENERAL DEMOGRAPHIC CHARACTERISTICS

The distribution of youth by gender, socioeconomic status and urbanity are shown in Table 1. There were more females (54.8%) than males in the study. Mean age of participants was 15.9 years (ranged 14 to 20 years). Youth in the rural schools were older than youth in the semi-urban and urban schools. Socioeconomic status varied significantly by the geographic site, with rural children living in households with the fewest items and urban youth in households with the most items.

PMT PERCEPTIONS

In Table 2 we depict the overall scores on a scale of 1 (low) to 5 for the PMT construct variables for abstinence, as well as their variations by gender and urbanity with and without controlling for gender, age, SES and urbanity. Perceptions of self-efficacy, response efficacy, vulnerability to the adverse consequences of engaging in sex and perceived intrinsic rewards for engaging in sex were all < 2. Severity of the adverse outcomes was perceived as very high (4.8). Females perceived themselves to be less efficacious than did males with regard to remaining abstinent. They perceived greater external pressure ("extrinsic rewards"), but significantly less internal pressure "intrinsic rewards"), to engage in sex. They considered themselves less vulnerable to engage in sex.

HIV/AIDS KNOWLEDGE

Knowledge among all respondents, by gender, and by geographic setting of the schools was shown at the top of Table 3. Overall, youth answered approximately two-thirds of the 23 questions correctly. Males appear to be significantly more knowledgeable than females. Urban youth, answering about three-quarters of the questions correctly, answered significantly more answers correctly than did rural (59% correct response) and semi-rural youth (about 63% correct response).

INTENTIONS TO ENGAGE IN RISK BEHAVIORS

Intentions to engage in one of several risk behaviors are also depicted in Table 3. About one-tenth of youth considered it likely or very likely that they would use alcohol or engage in sex in the next six months. Boys were more likely than girls to intend to smoke, consume alcohol and engage in sex. The greatest gender difference was seen with regard to sexual experience, with males being six-fold more likely than females to have engaged in sex. Youth in rural and semi-urban areas compared to urban areas were more likely to intend to engage in sex in the next six months. Not shown in this table, intention to engage in one risk behavior was highly correlated with intention to engage in other risk behaviors. A youth who intended to engage in sex compared to one who did not, was 3.6 fold more likely to intend to use alcohol, and 7.1 times more likely to intend to use tobacco.

RISK BEHAVIORS

Risk behaviors in the last six months ranged from 1% (drug use) to 18% (alcohol use) overall. All risk behaviors were significantly more prevalent among males, except for

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alcohol use which did not differ by gender. Only alcohol use differed by geographic location, with its use more common among youth in semi-urban sites compared to those in urban sites (See Table 3).

Overall 5% of youth reported ever having engaged in sex. Significantly more males than females reported this behavior, with a nearly three-fold difference.

Involvement in one risk behavior was highly correlated with involvement in other risk behaviors. Not shown in this table, youth who consumed alcohol were respectively 16.3, 2.9, 3.6 and 2.7 times more likely to have engaged in tobacco use, fighting, drug use and sex than youth without a history of alcohol use. Likewise, youth who fought were respectively 8.0, 2.8, 1.3 and 3.8 times more likely to have been involved in smoking, drinking, drug use and sex; youth who had smoked a cigarette were respectively 4.2, 5.1, 23.5 and 5.6 times more likely to have been involved in fighting, drinking, drug use and sex; and youth who had had sex were respectively 2.9, 6.1, 2.2 and 7.9 times more likely to be associated with fighting, tobacco use, drinking and drug use.

CORRELATION BETWEEN INTENTION AND BEHAVIOR

As shown in Table 4, prior engagement by a youth in a risk behavior (smoking, drinking or sexual behavior) greatly increased the odds of youth intending to engage in that risk behavior in the future; ORs for these three risk behavior ranged from 13 (sexual behavior) to 25 (smoking). After controlling gender, age, SES and urbanity, the likelihood of risk involvement in that behavior over the past six months were 10 to 20-fold greater among youth intending to engage in the behavior.

CORRELATION BETWEEN PMT PERCEPTION, HIV/AIDS KNOWLEDGE AND SEXUAL EXPERIENCE AND INTENTION

Table 5 displays the relationship between perceptions of sexual activity according to the PMT constructs, HIV/AIDS knowledge and history of sexual experience and intention using logistic regression analysis. Intentions to engage in sex are positively correlated with response efficacy (OR = 1.40) and perceived vulnerability (OR = 2.22), and are negatively correlated with response cost (OR = 0.93) and extrinsic rewards (OR = 0.30). A history of sexual activity is positively correlated with self-efficacy and intrinsic rewards (OR = 1.71 and 1.51 respectively) and are negatively related with extrinsic rewards (OR = 0.52), controlling for gender, age, urbanity, SES and intention to engage in sex.

DISCUSSION

This study, conducted among youth attending grade 11 in eight higher secondary schools in North Goa, revealed substantial gender and geographic differences with regard to perceptions, knowledge, intentions and behaviors. Actual rates of risk behaviors were lower than many youth in their age cohort across the globe [31, 33–37], although there was a small cohort engaging and intending to engage in multiple risk behaviors. The correlation between intention, and behavior is consistent with that seen in other settings [38–40]. The level of HIV/AIDS knowledge among the Goan youth are in the moderate range, as indicated by a correct response rate in the present study of 64% (14.8/23) This finding is similar to those from

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some Asia countries [41, 42] and our previous studies in The Bahamas[27]. Although HIV/AIDS knowledge did not demonstrate significant relationship with sexual behaviors in this study, the lower level of knowledge suggests that the education about HIV/AIDS knowledge is needed.

The observed relationships between self-efficacy and sexual behavior and between extrinsic rewards and sexual behavior were not expected, both because they were counter-intuitive according to PMT and were not consistent with some longitudinal studies [27, 38]. One possible explanation is that those youth without sexual experience had not yet had the opportunity or the desire to engage in sex and thus had no sense of their ability to control their sexual behavior. The inverse relationship between extrinsic rewards and sexual activity may reflect conflicted feelings on the part of the sexually active youth resulting from the strong social pressure to refrain from sex before marriage.

The finding of higher sexual, alcohol and aggressive (fighting) risk involvement and risk intention among adolescent males than females has been noted in settings across the globe [31, 33–35,43, 44]. The lower perceptions of self-efficacy among girls to control the circumstances under which they engage in sex suggest the importance of refusal skills and sexual negotiation practice for girls. Such training may be especially important since the girls were also less likely to believe that sexual refusal could work. Girls perceived very high external pressure to engage in sex. Given the low rates of sexual activity and the very low rates of intrinsic rewards for engaging in sex (mean score = 1.7), this finding was surprising and will require further exploration to understand the origin of this perception. Our focus group discussion suggested that at least some of this pressure may be arising from a combination of media influences and pressure from male friends. The observation that the PMT perceptions of the rural site were generally consistent with those of the males while the perceptions of the urban site were more consistent with that of the females is interesting given that both the urban areas and females had significantly lower rates of sexual intentions. However, although low among all groups, actual rates of sexual activity did not differ between the rural and urban areas while they did differ between males and females. The significant differences in knowledge, intentions and actual behaviors between rural and urban settings suggest that different intervention strategies may be needed. Youth in the rural areas appear to be in greater need of basic facts in addition to skills. Moreover, given the robust relationship between intention and subsequent action in settings across the globe where this relationship has been examined [38, 39], rural youth appear to be especially at higher risk for onset of sexual activity in the absence of sufficient knowledge.

As we have seen in some other settings in Asia [45–47], compared to the United States (http://www.cdc.gov/HealthyYouth/yrbs/index.htm) and many countries in Africa [44, 48] and Europe [37, 49], rates of sexual and other risk behaviors are low. Nonetheless, the small numbers of youth engaging in one risk behavior appear to be at substantially increased risk for involvement in other risk behaviors. It appears that the theory of covariation of risk behavior, as has been seen in other Asian countries [45], is also applicable to Goa. This finding emphasizes the importance and urgency for initiating targeted interventions for these higher risk youth in Goa.

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There are several limitations in current study. First, this was a cross-sectional and not a longitudinal study, and thus the relationship between factors is an association, and not causal. Second, the sample was a convenience sample in that only one-fifth of the higher secondary schools participated, even though an attempt was made to include geographic representation. The selected schools did not include schools accepting children of migrant workers as students and so may not reflect the knowledge, perceptions, intention or behaviors of these youth and nor of the out-of-school youth. Third, the low Cronbach alpha values for a few of the PMT subscales may impact stability of measurement and need further improved for future evaluation. Finally, during the administration of the questionnaire we became aware that despite our pilot testing of the instrument, some of the youth appeared to struggle with the questionnaire.

CONCLUSIONS

The findings of this study indicate the need for enhanced HIV risk reduction in a manner that is sensitive to the wide range of knowledge, awareness, intentions and experience among the students. Such training will need to be sensitive to the youth who appear not to have seriously considered many of the scenarios addressed in the questions, while simultaneously providing the skills to those youth already engaging in or expecting to engage in risk behavior.

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References

1. UNAIDS. [Last accessed November 17, 2008] 2008 Report on the global AIDS epidemic. http://www.unaids.org/en/KnowledgeCentre/HIVData/GlobalReport/2008/
2. UNAIDS, WHO. [Last accessed June, 2008] AIDS Epidemic update. 2007. www.unaids.org
3. Steinbrook R. HIV in India - A complex epidemic. New England Journal of Medicine. 2007; 356(11):1089–93. [PubMed: 17360986]
4. National Institute of Medical Statistics and National AIDS Control Organisation. Techinal Report: India HIV Estimates-2006. New Dehli: Government of India; 2006.
5. Jejeebhoy SJ. Adolescent sexual and reproductive behavior: A review of the evidence from India. Social Science & Medicine. 1998; 46(10):1275–90. [PubMed: 9665560]
6. Jejeebhoy S, Sebastian M. Actions that protect: promoting sexual and reproductive health and choice among young people in India. Regional Working Papers South East Asia 2003. 2003; 18:1–61.
7. Goparaju, L. Unplanned, unsafe: male students' sexual behaviour. Paper presented at workshop on sexual aspects of AIDS/STD Prevention in india; Bombay. 1993 November 23–27;
8. Bansal R. Sexual behavior and substance use patterns amongst adolescent truck cleaners and risk of HIV/AIDS. Ind J Matern Child Health. 1992; 3(4):108–10.
9. Sharms, V.; Sharma, A. Safe sex: a mirage in a desert? The sexual behavior of adolescent boys in Gujarat, India. Paper presented at the 6th International Congress on Adolescent Health; Vancouver, Canada. 1995:March 20–5;

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10. Duong CT, Nguyen TH, Hoang TT, Nguyen VV, Do TM, Pham VH, et al. Sexual risk and bridging behaviors among young people in Hai Phong, Vietnam. AIDS Behav. 2008; 12(4):643–51. [PubMed: 17636375]
11. Morris M, Podhisita C, Wawer MJ, Handcock MS. Bridge populations in the spread of HIV/AIDS in Thailand. Aids. 1996; 10(11):1265–71. [PubMed: 8883589]
12. Ford K, Sohn W, Lepkowski J. American adolescents: Sexual mixing patterns, bridge partners, and concurrency. Sexually Transmitted Diseases. 2002; 29(1):13–9. [PubMed: 11773873]
13. Adimora AA, Schoenbach VJ, Doherty IA. HIV and African Americans in the southern United States: Sexual networks and social context. Sexually Transmitted Diseases. 2006; 33(7):S39–S45. [PubMed: 16794554]
14. Coates T, Richter L, Caceres C. Behavioral strategies to reduce HIV transmission: how to make them work better. The Lancet. 2008 in press.
15. Runge C, Prentice-Dunn S, Scogin F. Protection motivation theory and alcohol use attitudes among older adults. Psychol Rep. 1993; 73(1):96–8. [PubMed: 8367585]
16. Helmes AW. Application of the protection motivation theory to genetic testing for breast cancer risk. Prev Med. 2002; 35(5):453–62. [PubMed: 12431894]
17. Schaffer SD, Tian L. Promoting adherence: effects of theory-based asthma education. Clin Nurs Res. 2004; 13(1):69–89. [PubMed: 14768768]
18. Wright AJ, French DP, Weinman J, Marteau TM. Can genetic risk information enhance motivation for smoking cessation? An analogue study Health Psychol. 2006; 25(6):740–52. [PubMed: 17100502]
19. Lwin MO, Saw SM. Protecting children from myopia: a PMT perspective for improving health marketing communications. J Health Commun. 2007; 12(3):251–68. [PubMed: 17497379]
20. Ouimet MC, Morton BG, Noelcke EA, Williams AF, Leaf WA, Preusser DF, et al. Perceived risk and other predictors and correlates of teenagers' safety belt use during the first year of licensure. Traffic Inj Prev. 2008; 9(1):1–10. [PubMed: 18338289]
21. Wood ME. Theoretical framework to study exercise motivation for breast cancer risk reduction. Oncol Nurs Forum. 2008; 35(1):89–95. [PubMed: 18192157]
22. Rogers, RW. Social Psychology. New York, NY: Guilford; 1983. Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation; p. 153-61.
23. Prentice-Dunn S, Rogers RW. Protection motivation theory and preventive health: Beyond the health belief model. H Ed Res. 1986; 1(3):153–61.
24. Li X, Fang X, Lin D, Mao R, Wang J, Cottrell L, et al. HIV/STD risk behaviors and perceptions among rural-to-urban migrants in China. AIDS Educ Prev. 2004; 16(6):538–56. [PubMed: 15585430]
25. Li X, Stanton B, Wang B, Mao R, Zhang HS, Qu MF, et al. Cultural adaptation of the focus on kids program for college students in China. Aids Education and Prevention. 2008; 20(1):1–14. [PubMed: 18312063]
26. Kaljee LM, Genberg B, Riel R, Cole M, Tho le H, Thoa le TK, et al. Effectiveness of a theory-based risk reduction HIV prevention program for rural Vietnamese adolescents. AIDS Educ Prev. 2005; 17(3):185–99. [PubMed: 16006206]
27. Deveaux L, Stanton B, Lunn S, Cottrell L, Yu S, Brathwaite N, et al. Reduction in human immunodeficiency virus risk among youth in developing countries. Arch Pediatr Adolesc Med. 2007; 161(12):1130–9. [PubMed: 18056557]
28. National AIDS Control Organization. HIV/AIDS epidemiological Surveillance & Estimation report for the year 2005. New Dehli: Government of India; Apr. 2006
29. Hargreaves JR, Bonell CP, Boler T, Boccia D, Birdthistle I, Fletcher A, et al. Systematic review exploring time trends in the association between educational attainment and risk of HIV infection in sub-Saharan Africa. AIDS. 2008; 22(3):403–14. [PubMed: 18195567]
30. Stanton B, Black M, Feigelman S, Ricardo I, Galbraith J, Li X, et al. Development of a culturally, theoretically and developmentally based survey instrument for assessing risk behaviors among African-American early adolescents living in urban low-income neighborhoods. AIDS Educ Prev. 1995; 7(2):160–77. [PubMed: 7619645]

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31. Stanton B, Fang X, Li X, Feigelman S, Galbraith J, Ricardo I. Evolution of risk behaviors over 2 years among a cohort of urban African American adolescents. Arch Pediatr Adolesc Med. 1997; 151(4):398–406. [PubMed: 9111440]
32. Jessor R, Chase JA, Donovan JE. Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. Am J Public Health. 1980; 70(6):604–13. [PubMed: 7377436]
33. Stanton B, Cole M, Galbraith J, Li X, Pendleton S, Cottrel L, et al. Randomized trial of a parent intervention: parents can make a difference in long-term adolescent risk behaviors, perceptions, and knowledge. Arch Pediatr Adolesc Med. 2004; 158(10):947–55. [PubMed: 15466681]
34. Wu Y, Stanton BF, Li X, Galbraith J, Cole ML. Protection motivation theory and adolescent drug trafficking: relationship between health motivation and longitudinal risk involvement. J Pediatr Psychol. 2005; 30(2):127–37. [PubMed: 15681308]
35. Siegel DM, Aten MJ, Enaharo M. Long-term effects of a middle school- and high school-based human immunodeficiency virus sexual risk prevention intervention. Archives of Pediatrics & Adolescent Medicine. 2001; 155(10):1117–26. [PubMed: 11576006]
36. Rutman S, Park A, Castor M, Taualii M, Forquera R. Urban American Indian and Alaska Native Youth: Youth Risk Behavior Survey 1997–2003. Maternal and Child Health Journal. 2008; 12:S76–S81.
37. de Nooijer J, de Vries NK. Monitoring health risk behavior of Dutch adolescents and the development of health promoting policies and activities: the E-MOVO project. Health Promot Int. 2007; 22(1):5–10. [PubMed: 17015406]
38. Stanton B, Li X, Black MM, Ricardo I, Galbraith J, Feigelman S, et al. Longitudinal stability and predictability of sexual perceptions, intentions, and behaviors among early adolescent African-Americans. Journal of Adolescent Health. 1996; 18(1):10–9. [PubMed: 8750423]
39. Yu S, Marshall S, Cottrell L, La XM, Liu HJ, Deveaux L, et al. Longitudinal predictability of sexual perceptions on subsequent behavioral intentions among Bahamian preadolescents. Sexual Health. 2008; 5(1):31–9. [PubMed: 18361852]
40. Feigelman S, Li XM, Stanton B. Perceived risks and benefits of alcohol, cigarette, and drug use among urban low-income African-American early adolescents. Bulletin of the New York Academy of Medicine. 1995; 72(1):57–75. [PubMed: 7581315]
41. Yoo H, Lee SH, Kwon BE, Chung S, Kim S. HIV/AIDS knowledge, attitudes, related behaviors, and sources of information among Korean adolescents. Journal of School Health. 2005; 75(10): 393–9. [PubMed: 16313510]
42. Chen X, Ding X, Gu Y. Survey on knowledge, attitudes and behaviors towards HIV/AIDS among middle school students in future county Anhui Province. Chin J drug Depend. 2007; 16(1):48–50.
43. Gong J, Chen X, Guo Q, Zhou D, Palmer PH, Zhang D, et al. Are private school students more likely to smoke than public school students in China? Preventive Medicine. 2006; 43(2):117–21. [PubMed: 16675006]
44. Frank S, Esterhuizen T, Jinabhai CC, Sullivan K, Taylor M. Risky sexual behaviours of high-school pupils in an era of HIV and AIDS. S Afr Med J. 2008; 98(5):394–8. [PubMed: 18637313]
45. Kaljee LM, Genberg BL, Minh TT, Tho LH, Thoa LTK, Stanton B. Alcohol use and HIV risk behaviors among rural adolescents in Khanh Hoa Province Viet Nam. Health Education Research. 2005; 20(1):71–80. [PubMed: 15198997]
46. Wang N. AIDS epidemic characteristics in China. Infect Dis Info. 2007; 20(6):325–6. 48.
47. Johnson CA, Palmer PH, Chou CP, Pang ZC, Zhou DJ, Dong LJ, et al. Tobacco use among youth and adults in mainland China: The China Seven Cities Study. Public Health. 2006; 120(12):1156–69. [PubMed: 17007895]
48. Mpofu E, Caldwell L, Smith E, Flisher AJ, Mathews C, Wegner L, et al. Rasch modeling of the structure of health risk behavior in South African adolescents. J Appl Meas. 2006; 7(3):323–34. [PubMed: 16807497]
49. Holmberg LI, Hellberg D. Health, health-compromising behavior, risk-taking behavior and sexuality in female and male high school students in vocational compared with theoretical programs in Sweden. Int J Adolesc Med Health. 2007; 19(4):459–72. [PubMed: 18348421]

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Coping Appraisal

Self efficacy (5 – "Strongly agree" to 1 – "strongly disagree", Cronbach α = 0.78)

1. I can be in a serious relationship for a long time and not engage in sexual behaviors
2. Even if my partner wants us to start a sexual relationship. I can convince him/her that we should wait
3. Even if I feel desire for my partner, I can stop myself from engaging in sexual behaviors
4. I have control over my body, and can avoid engaging in sexual behaviors.
5. I can wait until I am married before I have a sexual relationship.

Response Efficacy (5 – "Strongly agree" to 1 – "strongly disagree", Cronbach α = 0.44)

1. Not having sex is the best way of protecting a girl from getting pregnant
2. I want to wait until I'm married before I have sex

Response Cost (5 – "Strongly agree" to 1 – "strongly disagree", Cronbach α = 0.34)

1. If a guy says he won't have sex, a girl would say okay
2. If a girl says she won't have sex, a boy would say okay
3. Kids my age respect a girl who is a virgin

Threat Appraisal

Extrinsic Rewards (Cronbach α = 0.68)

1. I want kids my age to think I am having sex (5 – "Strongly agree" to 1 – "strongly disagree")
2. I want kids my age to think I am a virgin (1 – "Strongly agree" to 5 – "strongly disagree")
3. How many of your close friends have had sex (5-"Most", 3 – "Some", 1 – "None have sex")
4. How many of the boys you know have had sex (5-"Most", 3 – "Some", 1 – "None have sex")
5. How many of the girls you know have had sex (5-"Most", 3 – "Some", 1 – "None have sex")

Intrinsic Rewards (5 – "very bad" to 1 – "very good", Cronbach α: NA)

1. How do you feel about having sex

Severity (5 – "very bad" to 1 – "very good", Cronbach α= 0.37)

1. How would you feel to get a STI (sexually transmitted disease)
2. How would you feel to get pregnant or get a girl pregnant

Vulnerability (1 –"Very unlikely" to 4 – "very likely", Cronbach α: NA)

1. Get pregnant or get a girl pregnant

Figure 1.

Constructs and items of PMT regarding abstinence among Indian youth

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Table 1

Demographic characteristics of participants, by geographic location

Characteristics	Overall	Rural	Semi-urban	Urban	*P* value
Sample size, N (%)	942 (100.0)	337 (35.8)	380 (40.3)	225 (23.9)	<.0001
Male, N (%)	423 (45.2)	172 (51.7)	151 (39.8)	100 (44.8)	0.0067
SES, %					
0 -	8.2	13.1	7.9	1.3	
5 -	35.9	48.7	38.2	12.9	
10–15	56.0	38.3	54.0	85.8	
mean (SD)	9.8 (3.5)	8.4 (3.2)	9.8 (3.4)	12.1 (2.6)	<.0001
Age in years, %					
14 -	1.5	1.2	1.9	1.3	
15 -	32.7	23.5	41.2	32.0	
16 -	44.4	45.5	38.8	52.0	
17 -	17.2	22.9	14.0	14.2	
18 – 20	4.3	6.9	4.2	0.4	
mean (SD)	15.9 (0.9)	16.1 (0.9)	15.8 (0.9)	15.8 (0.7)	<.0001

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Table 2

Mean and adjusted mean of each PMT construct, by gender and sites

		Gender		Site		
PMT construct	**Overall**	**Male**	**female**	**Rural**	**Semi-urban**	**Urban**
Self-efficacy	2.0	2.2 (2.1)	1.9 (1.9)***	2.2 (2.1)***	2.0 (2.0)*	1.7 (1.8)
Response efficacy	2.0	2.2 (2.1)	1.8 (1.8)***	2.2 (2.1)***	2.0 (2.0)**	1.7 (1.8)
Response cost	3.0	3.1 (3.1)	3.0 (3.0)	2.8 (2.9)***	3.1 (3.1)	3.2 (3.1)
Extrinsic rewards	3.9	3.6 (3.7)	4.1 (4.1)***	3.7 (3.7)***	4.0 (3.9)**	4.1 (4.1)
Intrinsic rewards	1.7	2.1 (2.1)	1.4 (1.4)***	1.9 (1.9)**	1.7 (1.7)	1.5 (1.6)
Severity	4.8	4.7 (4.7)	4.9 (4.9)***	4.7 (4.7)***	4.8 (4.8)**	4.9 (4.9)
Vulnerability	1.2	1.4 (1.3)	1.2 (1.2)***	1.4 (1.3)*	1.2 (1.2)	1.2 (1.2)

The adjusted mean was presented in parenthesis

Higher values on the self-efficacy, response efficacy, severity and vulnerability subscales, and lower values on the intrinsic rewards, extrinsic rewards and response cost subscales indicate a protective effect

* p≤0.05;

** p≤0.01;

* p≤0.001

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Table 3

Knowledge, intention, and risk behaviors overall, by gender and by geographic location

		Gender		Site [a]		
Variable	**Overall**	**Male**	**female**	**Rural**	**Semi-urban**	**Urban**
HIV/AIDS knowledge, score 0–23, mean (adjusted mean)	14.8	15.3 (15.5)	14.4 (14.6) **	13.6 (13.9)***	14.4 (14.5)***	17.1 (16.7)
Intention to… in the next 6 months, % *(adjusted rate)*						
have sex	10.7	19.7 (18.4)	3.4 (3.2)***	13.6 (13.6)**	11.5 (13.4)**	5.9 (5.4)
Smoke a cigarette	5.4	8.7 (8.4)	2.5 (2.6)***	6.4 (7.1)	4.7 (5.5)	5.4 (4.0)
Drink alcohol	10.8	12.3 (11.9)	9.2 (9.5)	6.9 (9.3)	10.4 (10.7)	16.2 (12.1)
Risk behaviors in last 6 mo, % (adjusted rate)						
Fighting	16.5	23.9 (22.9)	10.1 (10.3)***	14.2 (15.6)	17.1 (19.0)	18.8 (15.2)
Smoking (tobacco)	3.8	7.4 (7.2)	1.0 (1.0)***	4.2 (4.1)	3.7 (4.5)	3.6 (3.7)
Drinking alcohol	17.8	18.1 (17.4)	17.3 (17.0)	13.3 (17.1)	20.1 (20.5)*	20.4 (14.0)
Drug use	1.1	2.1 (2.2)	0.2 (0.4)*	1.2 (1.0)	0.3 (0.5)*	2.2 (2.5)
Ever had sex (anal or vaginal) % (adjusted rate)	5.2	8.3 (7.7)	2.7 (2.7)***	5.3 (4.7)	5.5 (6.2)	4.4 (4.6)

[a] Urban was the reference group for statistical comparisons

Adjusted for age, SES, and gender (for site comparison) or site (for gender comparison)

* p≤0.05;

** p≤0.01;

* p≤0.001

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Table 4

Odds Ratio and 95% CI of risk behavior by intention among Indian youth

Variables	Estimate	*OR* values (95% CI)	Wald $\chi 2$	*P* values
		Engage in sex		
Intention to sex				
Non-adjusted	2.6	13.5 (7.2, 25.6)	64.4	<.0001
Adjusted [1]	2.3	9.7 (4.8, 19.5)	40.1	<.0001
		Engage in smoking		
Intention to smoke a cigarette				
Non-adjusted	3.2	24.9 (11.7, 53.2)	69.0	<.0001
Adjusted [1]	3.0	19.7 (8.7, 44.4)	51.8	<.0001
		Engage in drinking		
Intention to drink alcohol				
Non-adjusted	3.0	20.0 (11.9, 33.6)	127.0	<.0001
Adjusted [1]	2.9	17.7 (10.2, 30.6)	105.6	<.0001

[1] Adjusted for gender, age, urbanity and SES using logistic regression analysis.

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Table 5

Odds Ratio and 95% CI of sexual behavior, intention by PMT constructs and HIV/AIDS knowledge among Indian youth

Variables	Estimate	OR values (95% CI)	Wald χ2	P values
		Intention to have sex		
PMT				
Self-efficacy	0.31	1.36 (0.88, 2.10)	1.91	0.1669
Response efficacy	0.34	1.40 (1.01, 1.96)	3.99	0.0457
Response cost	−0.07	0.93 (0.60, 1.44)	0.11	0.7392
Extrinsic rewards	−1.21	0.30 (0.19, 0.48)	24.64	<.0001
Intrinsic rewards	0.60	1.82 (1.40, 2.37)	19.92	<.0001
Severity	0.15	1.16 (0.67, 2.01)	0.29	0.5875
Vulnerability	0.80	2.22 (1.40, 3.50)	11.73	0.0006
HIV/AIDS knowledge	0.03	1.03 (0.92, 1.14)	0.24	0.6236
		Engage in sex		
PMT				
Self-efficacy	0.54	1.71 (1.04, 2.82)	4.41	0.0357
Response efficacy	0.13	1.14 (0.76, 1.71)	0.42	0.5154
Response cost	0.21	1.23 (0.73, 2.09)	0.62	0.4317
Extrinsic rewards	−0.65	0.52 (0.30, 0.90)	5.47	0.0193
Intrinsic rewards	0.41	1.51 (1.10, 2.06)	6.59	0.0103
Severity	0.42	1.52 (0.71, 3.28)	1.17	0.2798
Vulnerability	0.22	1.25 (0.71, 2.19)	0.60	0.4393
HIV/AIDS knowledge	−0.01	0.99 (0.88, 1.11)	0.05	0.8209

Adjusted for gender, age, urbanity, SES using logistic regression analysis

Higher values on the self-efficacy, response efficacy, severity and vulnerability subscales, and lower values on the intrinsic rewards, extrinsic rewards and response cost subscales indicate a protective effect