HIV/AIDS KNOWLEDGE, ATTITUDES AND BELIEFS BASED PREDICTION MODELS FOR PRACTICES IN PRISON INMATES, SINDH, PAKISTAN

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Abstract. This study was conducted on prison inmates in Sindh to determine whether HIV/AIDS related knowledge, attitudes and beliefs can predict their practices which risk HIV infection. A pre-designed questionnaire was administered in this cross-sectional study to collect the data on HIV/AIDS related knowledge, attitudes, beliefs, practices and demographic variables in a systematic sample of 3,395 prison inmates during July 1994. The data on responses of inmates to HIV/AIDS related knowledge, attitudes, and beliefs were analyzed and a clear interpretable factor structure emerged for each set of questions labeled as knowledge, attitude and beliefs. Similarly based on responses of inmates to practice questions, three factors emerged and were labeled as heterosexuality, homosexuality and drugs. The standardized factor scores of inmates for each of these six factors were computed and used in further analyses. Multiple linear regression analyses were carried out separately using heterosexuality, homosexuality and drugs factors score as dependent variables to identify if any of the independent variables (demographic variables, knowledge beliefs and attitude) predict these practice factors. The model for heterosexuality explained 23% of the variance and included HIV/AIDS related knowledge, beliefs, age, ethnicity and marital status and duration of imprisonment ($F = 84.33$, $p < 0.001$; $R^2 = 23.0$). The predictors in the model for homosexuality together explained 10% of the variance and included significant contribution by belief, martial status, ethnicity, education, age and duration of imprisonment ($F = 24.76$, $p < 0.001$; $R^2 = 0.10$). The model for drugs had significant contributions from HIV/AIDS related beliefs, marital status and ethnicity ($F = 20.10$, $p < 0.001$; $R^2 = 0.03$). Implications of prevention program based on these results are considered.

INTRODUCTION

Infection with human immunodeficiency virus type 1 (HIV-1) was first recorded in Pakistan during 1986 and as of March 1998, there were 1,308 HIV-1 seropositive and 149 acquired immunodeficiency syndrome (AIDS) cases reported in the country (UNAIDS, 1998). Of these, 345 HIV-1 seropositive and 62 AIDS patients are present in Sindh. HIV seroprevalence estimates (per 1,000) of 0.29 among male prison inmates in Sindh have been reported (Baqi *et al*, 1998). Although the estimated prevalence of HIV infection among male inmates in prisons of Sindh is under 1%, yet high risk individuals are concentrated in the prison system. These prison inmates in Sindh represent a population not only at a significant risk of becoming HIV infected but also have the potential to become a reservoir of HIV in the general population (Khan *et al*, 1998). Since most prisoners remain in prisons for relatively short periods and then become part of the general population (Mutter *et al*, 1994). Outside Pakistan prisons are high risk settings for HIV transmission. The risk of acquisition of HIV infection in such an environment depends on the HIV prevalence, knowledge about HIV transmission as well as adapted risky practices of inmates (Mutter *et al*, 1994). A substantial proportion of prisoners engage in high risk sexual activities and intravenous (IV) drug use before their present incarceration (Bird *et al*,

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1993a) and while in prison (Douglas *et al*, 1989; Farrell and Strang, 1991; Gaughwin *et al*, 1991; Kennedy *et al*, 1992; Power *et al*, 1992), thus remain vulnerable to HIV infection (Taylor *et al*, 1995).

Many HIV prevention efforts rely on providing general information about HIV transmission (Mahon, 1996). However, improved knowledge about HIV/AIDS transmission may not necessarily lead to changes in HIV/AIDS related behavior mainly because inmates' overall knowledge about HIV transmission remains uneven (Bird *et al*, 1993b; Mahon, 1996). Previous research, also demonstrated that in spite of widespread knowledge and appreciation of inherent risks, individuals from high risk groups continue use IV drugs and to practice unprotected anal intercourse with partners of unknown HIV status (Stahl *et al*, 1986; Rosser *et al*, 1993; Kelly *et al*, 1995). These behaviors are commonly prevalent in prisons and have been consistently demonstrated as primary risk factors for HIV-1 infection among homosexuality active men (Harris *et al*, 1983; Fauci and Lane, 1994).

Future projection of HIV epidemic and conduct of HIV intervention programs require continuous evaluation of heterogeneous mixing and other risky behaviors (Melbye and Bigger, 1992). By assessing the HIV/AIDS related knowledge, attitude, beliefs and their relationship with high risk practices it is possible to develop behavioral intervention that may help in primary prevention. Therefore, we conducted this study of Sindh prisons' inmates to assess their knowledge about HIV/AIDS transmission and to determine whether the HIV/AIDS related knowledge, attitudes and beliefs of our study subjects can predict practices which risk HIV infection.

METHODS

Subjects

Pakistan is an Islamic Republic with an estimated population of 140 million having an average per capita annual income of US$ 430 and adult literacy rate of approximately 38% (UNICEF, 1997). Sindh province comprises largely a rural population along with the Indus River and its canals and tributaries. Elsewhere, the landscape is arid. The population is a mixture of different ethnic/tribal groups. The Sindh Prisons System consists of 16 facilities (2 for female inmates) widely distributed over 140,914 km^2. The inmate population in July 1994 was an estimated 10,600 male prisoners incarcerated in judicial custody, as indicted criminals.

Sampling technique

The sampling technique employed has been described elsewhere in detail (Khan *et al*, 1998). Briefly, one-in-three systematic sampling procedure was employed to select 3,400 of all prisoners during July 1994. This sample size was a contractual requirement of prison authorities. Therefore, 4,700 (45%) of all prisoners were asked for their consent to participate in the study assuming a refusal rate of about 30%. This was accomplished by asking all inmates within a barrack to sit in rows, then according to a random number chosen between 1 and 3, the first prisoner was selected from each barrack followed by selection of every third inmate. Verbal consent of this inmate was sought to participate in the study. In case of refusal by the selected inmate, the next adjacent inmate was approached for his consent to participate in the study.

Questionnaire

A pre-structured questionnaire was used to interview each selected inmate in complete privacy by a trained interviewer. The questionnaire was comprised of questions regarding demographic, knowledge, attitudes, beliefs, practices and health information. HIV/AIDS related knowledge was measured by four questions. One of these four questions was a composite measure of having either correct or incorrect knowledge about the known routes of HIV transmission. This composite measure of knowledge about the known modes of HIV transmission was elicited through eleven items (true/false statements). These eleven items was

an intermix of five true and six false statements. An inmate was considered as having 'correct knowledge' of known routes of HIV transmission, if he answered all questions correctly, otherwise classified having 'incorrect knowledge'. Attitude and belief questions asked whether respondents believed that they were at risk to contract HIV infection and measured as true/ false answers to five questions. A third set of nine questions queried prisoners about practices, which could potentially result in HIV infection of the inmates.

Factor analysis

We carried out factor analyses separately of different sets of variables on HIV/AIDS related knowledge, attitude and beliefs, which yielded three clear, interpretable factor structures and labeled as knowledge, attitude and beliefs. Similarly we used responses to questions on HIV/AIDS related practices and three clear factors emerged and named as heterosexuality, homosexuality and drugs. A varimax rotation (which maximizes explained variation while maintaining orthogonality) was used to identify attitude and beliefs factors, whereas, all other factors were un-rotated, since only one factor emerged from respective subsets of variables. Factors with an eigen value of > 1.00 were extracted and items that loaded 0.40 and above were included in each factor (Afifi and Clark, 1984). The standardized factor scores of inmates for each of these six factors were computed and used in further analyses.

Regression analysis

Stepwise linear multiple linear regression was carried out (Kleinbaum *et al*, 1988) to identify if any of the independent variables (*ie* demographic characteristics, knowledge, attitude and beliefs factors) predict the practices factors (*ie* heterosexuality, homosexuality and drugs). Age (years), education (years in school) and duration of imprisonment (months) were categorized as quartiles and specified as dummy variables. Similarly ethnicity (mother tongue) and marital status were also specified as dummy variables. If any of the dummy variable(s) for a given level of variable(s) turned out to be significant the remaining dummy variable(s) for that variable were forced in the regression model for meaningful comparisons. In all the analyses, the 5% significance level ($\alpha = 0.05$) was used unless otherwise stated. All statistical analyses were carried out using SPSS/ PC windows version 7.5 (SPSS Inc, Chicago, IL, USA).

RESULTS

A total of 3,395 inmates had complete data on all the study variables, except duration of imprisonment, on which 20 (1%) had missing data. Study subjects were almost uniformly distributed within age and duration of imprisonment quartiles, two main ethnicity groups and two main marital status categories. Fifty

Table 1
Demographic variables on prison inmates surveyed for their HIV/AIDS related knowledge, attitudes, beliefs and practices, Sindh, Pakistan (N= 3,395).

Variable	No.	%
Age (years)		
< 23	846	25
23-26	686	20
> 26-33	1,006	30
> 33	857	25
Mother tongue		
Urdu	1,659	49
Sindhi	1,687	50
Others	49	1
Education (school years)		
0	1,711	50
1-4	416	12
5-10	916	27
> 10	352	11
Marital status		
Unmarried	1,561	46
Married	1,754	52
Separated/widowed	80	2
Duration of imprisonment (months)		
< 3	843	25
3-9	846	25
> 9-24	841	25
> 24	845	25

Table 2
Distribution of correct answers on selected HIV/AIDS knowledge, attitude, beliefs and practice questions asked from prison inmates, Sindh, Pakistan July 1994 (N = 3,395).

Variable (category and category code used in analyses)		(%)
Knowledge variables		
Have you ever heard about AIDS?		
Ever heard	(0)	32
Never heard	(1)	68
How does HIV/AIDS spread from patient to healthy individual?		
Correct knowledge	(0)	23
Incorrect knowledge	(1)	77
Does the person having multiple sex partners is at increased risk of contracting HIV/AIDS?		
Yes	(0)	22
No	(1)	78
Can use of condom protect from contracting HIV/AIDS?		
Yes	(0)	10
No	(1)	90
Attitudes and beliefs variables		
Are you scared of getting HIV/AIDS in future?		
Yes	(0)	13
No	(1)	87
Do you believe that there is chance of you having contracted HIV/AIDS?		
Yes	(1)	1
No	(0)	99
Have you ever been tested for AIDS?		
Yes	(1)	1
No	(0)	99
Do you believe that any of your sexual partners has more than one sexual partners?		
Yes	(1)	32
No	(0)	68
Do you believe that any of your sexual partners inject drugs?		
Yes	(1)	2
No	(0)	98
Practice variables		
Do you inject drugs intravenously?		
Yes	(1)	4
No	(0)	96
Do you share needles?		
Yes	(1)	1
No	(0)	99
Do you have sexual intercourse with a man?		
Yes	(1)	27
No	(0)	73
Do you have sexual intercourse with more than one man?		
Yes	(1)	21
No	(0)	79
Did you have sexual intercourse with a man within a year man prior to this incarceration?		
Yes	(1)	22
No	(0)	78
Did you have sexual intercourse with a man during current incarceration?		
Yes	(1)	3
No	(0)	97
Do you have sexual intercourse with a female?		
Yes	(1)	60
No	(0)	40
Do you have sexual intercourse with more than one female?		
Yes	(1)	53
No	(0)	47
Do you have sexual intercourse with a prostitute?		
Yes	(1)	26
No	(0)	74

percent of the inmates had no formal school education (Table 1). The distribution (%) of responses to knowledge, attitudes, beliefs, and practice questions is given Table 2.

The factor analyses results are shown in Table 3. The first factor was labeled as knowledge because of the loading of items asked from inmates concerned with information about HIV and its route of transmission. This factor accounted for 75.7% of variance. The second factor revealed was labeled as beliefs because of loading of items describing the opinion of inmates about sexual and injecting drug use behaviors of their sexual partners. A third factor labeled as attitude was identified because it contained items concerned with perception about personal risk of contracting HIV/

Table 3
The factor loadings between the HIV/AIDS related knowledge, attitude, beliefs and practice variables recorded on prison inmates and four factors derived from factor analysis, Sindh, July 1994, (n = 3,395).

Factor and items	Loading	Eigenvalue	Variance
Knowledge		3.03	75.69
Have you ever heard about AIDS?	0.87		
How does HIV/AIDS spread from patient to healthy individual?	0.93		
Does the person having multiple sex partners is at increased risk of contracting HIV/AIDS?	0.93		
Can use of condom protect from contracting HIV/AIDS?	0.73		
Attitude		1.37	27.30
Are you scared of getting HIV/AIDS in future?	0.74		
Do you believe that there is chance of you having contracted HIV/AIDS?	0.55		
Have you ever been tested for HIV/AIDS?	0.62		
Beliefs		1.09	21.80
Do you believe any of your sexual partner has more than one sexual partner	0.71		
Do you believe that any of your sexual partners inject drugs?	0.72		
Heterosexuality		2.17	72.40
Do you have sexual intercourse with a female?	0.89		
Do you have sexual intercourse with more than one female?	0.90		
Do you have sexual intercourse with a prostitute?	0.75		
Homosexuality		2.81	70.32
Do you have sexual intercourse with a man?	0.96		
Do you have sexual intercourse with more than one man?	0.93		
Did you have sexual intercourse with a man within a year prior to this incarceration?	0.92		
Did you have sexual intercourse with a man during this incarceration?	0.43		
Drugs		1.60	79.79
Do you inject drugs intravenously?	0.89		
Do you share needles?	0.89		

Table 4
Results of stepwise multiple linear regression analysis of heterosexuality factor score on demographic variables and HIV/AIDS related knowledge and belief factors in prison inmates, Sindh, Pakistan July 1994 (n = 3,375[a]).

Independent variable	b[b]	SE(b)[c]	β[d]	Sig(t)[e]
Knowledge	- 0.11	0.02	-0.11	<0.001
Beliefs	0.43	0.02	0.43	<0.001
Age (years)				
<23	rc[g]			
23-26	0.12	0.05	0.05	0.009
>26-33	0.20	0.04	0.09	<0.001
>33	0.002	0.05	0.001	0.959
Ethnicity				
Urdu	rc			
Sindhi	0.11	0.03	0.06	0.001
Others	-0.01	0.13	-0.01	0.471
Marital status				
Unmarried	rc			
married	-0.12	0.04	-0.06	0.001
W/S[f]	-0.04	0.10	-0.01	0.709
Duration of imprisonment (months)				
<3	rc			
3-9	0.19	0.04	0.08	<0.001
>9-24	0.23	0.04	0.10	<0.001
>24	0.25	0.05	0.11	<0.001
Constant	-0.24			
Multiple R^2	0.23			

[a] Twenty of inmates had incomplete missing observations on duration of imprisonment. Therefore, sample size reduced to 3,375 for multivariate models;
[b] Unstandardized partial coefficient; [c] Standard error of b; [d] Standardized partial coefficient; [e]p-value associated with partial *t*-statistics; [f]Widows or separated;
[g] Reference category.

AIDS, such as scarce of HIV/AIDS, chance of already contracting HIV and ever tested for HIV. The beliefs and attitude factors together accounted for 49.1% of the variance. Heterosexuality was the label given to fourth factor, because the items that loaded on it were concerned with number and type of female sexual partners and it accounted for 72.4% of the variance. A fifth factor was identified as homosexuality because it dealt with items concerning sexual intercourse with male partner(s) before and during incarceration. This factor accounted for 70.4% of variance. A sixth factor was identified as drugs as it contained items referring to injecting drugs use, and sharing needles. This factor accounted for 79.8% of the variance in its items.

Multiple linear regressions analysis

Multiple linear regression analyses were carried out separately using heterosexuality, homosexuality and drugs factors score as dependent variables to identify if any of the independent variables (demographic variables, knowledge beliefs and attitude) predict the practice factors. The model for heterosexuality explained 23% of the variance and included HIV/AIDS related knowledge, beliefs, age, ethnicity and marital status and duration of imprisonment ($F = 84.33$, $p < 0.001$; $R^2 = 23.0$)

Table 5
Results of stepwise multiple linear regression analysis of homosexuality factor score on demographic variables and HIV/AIDS related knowledge and belief factors in prison inmates, Sindh, Pakistan July 1994 (n = 3,375[a]).

Independent variable	b[b]	SE(b)[c]	β[d]	Sig(t)[e]
Beliefs	0.26	0.02	0.26	<0.001
Age (years)				
<23	rc			
23-26	-0.04	0.05	-0.02	0.432
>26-33	-0.04	0.05	-0.02	0.369
>33	0.02	0.05	-0.09	<0.001
Ethnicity				
Urdu	rc[g]			
Sindhi	0.22	0.04	0.11	<0.001
Others	-0.25	0.14	-0.03	0.070
Marital status				
Unmarried	rc			
Married	-0.11	0.04	-0.06	0.001
W/S[f]	-0.20	0.11	-0.03	0.066
Duration of imprisonment (months)				
<3	rc			
3-9	0.03	0.05	0.01	0.478
>9-24	0.19	0.05	0.08	<0.001
>24	0.12	0.05	0.05	0.010
Constant	-0.09			
Multiple R^2	0.10			

[a] Twenty of inmates had incomplete missing observations on duration of imprisonment. Therefore, sample size reduced to 3,375 for multivariate models;
[b] Unstandardized partial coefficient; [c] Standard error of b; [d] Standardized partial coefficient; [e]p-value associated with partial *t*-statistics; [f]Widows or separated;
[g] Reference category.

(Table 4). The predictors in the model for homosexuality together explained 10% of the variance and included significant contribution by belief, martial status, ethnicity, education, age and duration of imprisonment ($F = 24.76$, $p < 0.001$; $R^2 = 0.10$) (Table 5). Table 6 gives the model for drugs with significant contribution from HIV/AIDS related beliefs, marital status and ethnicity ($F = 20.10$, $p < 0.001$; $R^2 = 0.03$).

DISCUSSION

Studies on the rate of HIV transmission in prisons revealed seroconversion rates ranging from 0.16% to 21% (Horsburg *et al*, 1990; Mutter *et al*, 1994), suggesting that high risk behaviors are prevalent among prisons inmates (Gaughwin *et al*, 1991; Dolan *et al*, 1994; Turnbull *et al*, 1994). In Pakistan, however, there has been virtually no research on this issue. The present study evaluated the relationship of knowledge attitudes, and beliefs concerning HIV/AIDS to some risky practices using two multivariate analytical techniques, viz, factor analysis and stepwise multiple linear regression analysis. The major advantage of factor analysis is that it eases the analysis of complex survey results. Because there are fewer

Table 6
Results of stepwise multiple linear regression analysis of drugs factor score on demographic variables and HIV/AIDS related knowledge and belief factors in prison inmates, Sindh, Pakisatn July 1994 (n = 3,375[a]).

Independent variable	b[b]	SE(b)[c]	β[d]	Sig(t)[e]
Beliefs	0.13	0.02	0.13	<0.001
Ethnicity				
Urdu	rc[g]			
Sindhi	-0.11	0.04	-0.05	0.003
Others	0.44	0.14	0.05	0.002
Marital status				
Unmarried	rc			
Married	-0.09	0.04	-0.04	0.013
W/S[f]	-0.07	0.11	-0.01	0.537
Constant	0.09			
Multiple R^2	0.03			

[a] Twenty of inmates had incomplete missing observations on duration of imprisonment. Therefore, sample size reduced to 3,375 for multivariate models;
[b] Unstandardized partial coefficient; [c] Standard error of b; [d] Standardized partial coefficient; [e]p-value associated with partial t-statistics; [f]Widows or separated;
[g] Reference category.

factors than the original variables, the building of regression model is much simpler. Also, since the factors are independent, the problem of collinearity is avoided (Afifi and Clark, 1984).

HIV/AIDS related knowledge (about known routes of HIV transmission) was significantly related to heterosexuality (heterosexual practices involving multiple females and commercial sex workers), meaning that increase in HIV/AIDS knowledge score was significantly associated with increase in heterosexuality score in this study. These findings coincide with the results of previous studies that up to 14% prisoners reported high number of female sexual partners in the past year before their current sentence began and the numbers were slightly higher among drug users despite the education messages on electronic and print media (Bird *et al*, 1993a). Alternatively increase in score on heterosexual practices might be a due to misinformation and representing a state of confusion about AIDS among these inmates.

The HIV/AIDS related knowledge was not significantly associated with homosexuality (male to male sexual contact) and drugs (IV drug use and needle sharing). These findings are consistent with the results of other studies (Bird *et al*, 1993a; Mahon, 1996), which reported that homosexual practices are quite common in prisons. Furthermore, this observed relationship might be an indication of the fact that some of the inmates have homosexual contact in the prison, perhaps for the first time in their lives. It appears that HIV/AIDS related knowledge is not powerful enough to change homosexual and IV drug use practices. It has been demonstrated that increased knowledge about HIV/AIDS and risk of transmission did not bring significant changes in behaviors such as sharing needles and syringes (Fineberg, 1988). Thus any primary public health intervention just focusing on the improvement of knowledge about HIV transmission may not bring about substantial changes in HIV/AIDS related behaviors.

The inmates who believed that any of their sexual partners had more than one sexual

partners and/or inject drugs tended to have higher score on heterosexuality, homosexuality and drugs. Previous studies have shown that prisons inmates are more likely than the outside population to have had injected drugs, to have had multiple females sexual partners, and to have had sex with other men (Bird *et al*, 1992; 1993a,b). Study inmates who have risky behaviors perceive that their partners have high risk behaviors. Their perceptions are quite likely accurate, since sexual practices and drug use are biologically based, socially complex behaviors. Both derive from biological impulses that are hard to resist. Sexual activity may be spontaneous, unplanned and take place when judgment is clouded by drug use. It appears that many inmates in our study continue to have illusion about HIV/AIDS and do not know what sexual and drug precautions are necessary to avoid HIV transmission.

Some of the socio-demographic characteristics found to associated with the HIV/AIDS related risky practices of the inmates. The main determinants of risky heterosexual and homosexual practices were age, ethnicity, marital status and duration of imprisonment. Whereas, ethnicity and marital status correlated with IV drug use.

The inmates of age 23-33 years compared with those of age < 23 years reported to had been involved in risky heterosexual practices, whereas, those of aged > 33 years tended to indulge in homosexual practices. Previous studies (ACSF Investigators, 1992; Johnson *et al*, 1992; Bird *et al*, 1993a), reported that prisons are enriched not only for men who practice homosexuality (17%) but also for men with high rates of change in females sexual partners (35%) in similar age categories as were found in this study.

Sindhi inmates were protected against IV drug use but tended to report male to male sexual contact and risky heterosexual practices. A seemingly plausible explanation for these findings is that Sindhi inmates may be representing rural population of Sindh, where drugs have not made their way as yet, and their higher score on homosexual and heterosexual practices may be a revelation of opportunities for such practices they have had in rural areas. Ethnic differences in HIV/AIDS related behaviors are widely reported in AIDS literature (Mahon, 1996).

Married compared to unmarried inmates were significantly protected against all three HIV/AIDS related high risk practices including risky heterosexual, homosexual and IV drug use, may an indicative of precautions, they had been taking to safeguard their family life or they may be representing a substantive different populations.

Compared to inmates imprisoned for < 3 months, those who were imprisoned for ≥ 3 months tended to report having been involved in risky heterosexual practices and those who were imprisoned ≥ 9 also tended to report their involvement in homosexual practices during and prior to current incarceration. Published literature showed that men in prisons reported to had sex with many female sexual partners and men before incarceration (Bird *et al*, 1993a, b). Other studies of behavior and prevalence of HIV have shown that a period of imprisonment is an important predictor of being positive for HIV though they were unable to determine if transmission occurred there (Horsburg *et al*, 1990; Martin *et al*, 1990; Dolan *et al*, 1994).

The final multiple linear linear regression models for heterosexuality, homosexuality and drugs factors explained 23%, 10% and 3% of the variance in these dependent variables respectively. This suggests that while the assessed variables are strongly predictive of HIV/AIDS risk related practices, additional and un-assessed factors may influence these risky HIV/AIDS related behavior.

The implications of our findings are limited by a number of considerations, foremost of which is the cross-sectional study design used. Therefore, it is difficult to draw definitive conclusion about the presence or direction of causal effects. Also reliability of self-report can be controversial and there were obvious shortcoming in using self-reported knowledge,

attitudes, beliefs and practices. However, similar responses regarding knowledge, attitude and HIV risks are widely found in the literature (Wormser *et al*, 1993). Another limitation was that study subjects were not a random sample of the general population, rather they were a convenience sample of persons who were believed to be at risk for possible exposure to HIV infection, due to their specific circumstances. However, our results are generally consistent with findings of previous and mainly qualitative studies and extend their findings by controlling for potential confounders such as education, age, marital status, duration of imprisonment. Assuming that the variables significantly associated with HIV/AIDS related three types of risky behaviors in the regression models are indeed explanatory variables, some public health intervention to reduce HIV/AIDS risk associated with these practices can be formulated and implemented. To be effective, HIV/AIDS education must lead to changes in behavior that eliminate or substantially reduce the risk of HIV transmission. In conclusion, HIV/AIDS prevention program based on the ingredients including i). accurate perception of HIV/AIDS as dreadful disease and vulnerability to it, ii). appreciation of behavior change as a sole means to stemming further HIV spread, iii). firm knowledge of HIV transmission and, iv). clear-cut steps that individuals can take to protect themselves, may prove effective in this and other high risk population segments.

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