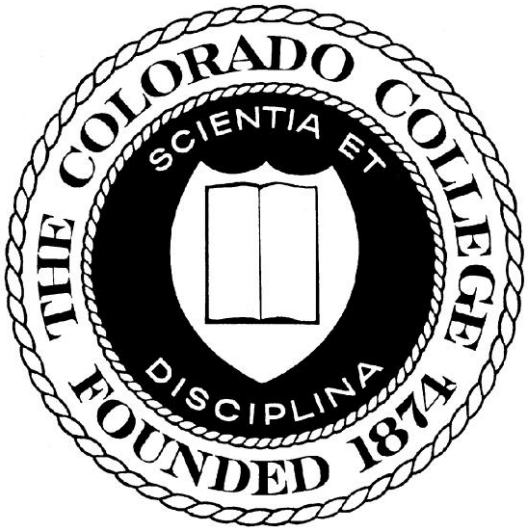
WORKING PAPER

On the Association Between HIV Knowledge and Risky Sexual Behavior in India?

by
Smriti Agarwal & Pedro de Araujo

Colorado College Working Paper 2012-03
April, 2012



Department of Economics and Business
Colorado College
Colorado Springs, Colorado 80903-3298
www.coloradocollege.edu/dept/EC

On the Association Between HIV Knowledge and Risky Sexual Behavior in India

Smriti Agarwal
London School of Economics

Pedro de Araujo*
Colorado College

Abstract

This paper estimates the association between HIV knowledge and risky sexual behavior in India. Using data from the third wave of the national demographic survey, we find that better HIV related knowledge does not always promote safer sexual practices. While, better HIV knowledge increases the likelihood of condom use, it also increases the likelihood of pre-marital sex, and reduces the likelihood of abstinence. These effects are much stronger for males when compared to females. These results also suggest, albeit indirectly, that informational and condom distribution campaigns are not necessarily promoting safer sexual practices in India.

Key Words: HIV/AIDS, Risky Behavior, India
JEL Classification: C13, C25, and O53

*E-mail: Pedro.deAraujo@coloradocollege.edu

1 Introduction

Since the beginning of the AIDS epidemic, almost 60 million people have been infected with HIV and 25 million people have died of HIV-related causes. Two thirds of all HIV cases are in sub-Saharan Africa, however, in countries where population density is high, like India, HIV can become a real economic problem.

In India, it has been estimated that 2.5 million people are living with HIV and it's extremely large and dense population implies the possibility that the epidemic becomes widespread. Eberstadt (2002) estimates that India will surprass sub-Saharan Africa in the number of HIV cases by 2025. The estimates range from 30 million to 140 million infections depending on the assumed degree of transmission rates. Factors associated with stigma, cultural taboos, and low levels of health may also contribute to the spread of the disease in India (Keshavan (2007)).

HIV prevention campaigns focused on widespread condom distribution and the dissemination of HIV related information have been the policy prescription that most governments have followed to combat the widespread of the disease. Educating individuals about the risks associated with AIDS as well as increasing knowledge on the modes of HIV transmission and prevention is believed to be the first and the most crucial step in battling the AIDS epidemic (Chatterjee (2003)). Thus, the majority of HIV/AIDS campaigns and other prevention programs aim at increasing AIDS-related knowledge among all types of people in India, especially those living in rural areas because of their limited access to education from other sources. The main goal of these campaigns is to, of course, reduce risky sexual behavior among the population.

In 1992, India's Ministry of Health and Family welfare established NACO, National AIDS Control Organization, to combat increasing HIV incidences by promoting HIV education and prevention programs. NACO plays an active role in increasing awareness about HIV/AIDS among the population and encourages behavioral changes by providing information, and promoting education and communication. The main objectives are raising awareness, knowledge and understanding of HIV/AIDS and promoting methods of prevention, such as safe sex through greater condom use, sterilization of needles and syringes, and avoidance of multiple partners. Thus, NACO has made an effort to monitor the disease trends and identify ways of avoiding the spread, but limited resources and political constraints have led to failure in their ability to increase prevention measures and provide antiretroviral drug treatment.

Hence, most of the attempts to reduce risky sexual behavior hinges on the assumption that increased HIV knowledge and availability of condoms is positively associated with safer sexual behavior. This paper explores this association using data from the third wave of the demographic health survey for India.

The findings indicate that this association is not always in the desired direction. That is, better knowledge about HIV can induce individuals to behave in a more riskier manner. The underlying hypothesis here is that the more knowledge one has about a certain subject, the more risk one is willing to take. Therefore, "treating" individuals with better HIV knowledge does not correlate with safer sexual behavior; in fact, the opposite can be the case. These results are consistent with experimental literature (Anderson (2011), Eckel and Grossman (2008)) as well as similar studies exploring similar associations in different countries (Corno and Walque (2007), Agarwal, de Araujo, and Paudel (2010))

2 Data and Methodology

Data for this study was obtained from the third wave of the demographic health survey (DHS) for India. The DHS is a population based survey that interviews individuals and households about family planning, health decisions, sexual behavior, and most recently HIV related knowledge. As the goal of the current paper is to investigate the association between HIV related knowledge and risky sexual behavior, the portion of the survey regarding these two features is used for both males and females. This survey is comprehensive enough to also capture all the controls used in the analysis.

2.1 Description of Variables

Three sets of variables are used in this analysis: risky sexual behavior variables, HIV related knowledge variables, and control variables. Most of these variables are categorical in nature as most survey questions require a yes or no answer. Descriptive statistics for most of these variables are displayed in table 1.

2.1.1 Risky Sexual Behavior

Four determinants of sexual behavior among men and women are used for this study. The first variable relates to condom use, that is, individuals were asked if they used a condom the last time they had sex. The second variable relates to pre-marital sexual activity, where single individuals were asked if they had already been exposed to sexual intercourse. The third variable relates to extra-marital sexual encounters, where, married individuals were asked if they have had sex with someone other than the spouse in the past 12 months. The

fourth variable relates to abstinence, where individuals were asked if they have had any sexual intercourse in the past 12 months. All the variables are binary with 0 representing safe sexual behavior and 1 representing risky sexual behavior. Based on the mean values of the four variables, there are several differences and similarities in the sexual behavior of men and women in India.

Despite men's high level of knowledge about condom use, on average 89.9% of the males did not use a condom during last intercourse. This number drops to 58% for single men, however, it is still fairly high even among this group. For women, condom use is very low regardless of marital status. Only 7% of women report using condoms in last intercourse. There might be several factors explaining this, including women's inability to convince their partners to use a condom, under-reporting due to fear of family and society (Porter (1993)), and their somewhat limited knowledge about HIV. This low incidence of condom use, even among single individuals can also potentially be explained by the limited access to condoms in rural areas combined to the poor quality of condoms produced in India (Vicziany (2001)). Pre-marital sex is much higher for single men (13.6%) compared to single women (1%), while extra-marital sex is very similar and low. Abstinence is much lower in single men compared to single women. These results point to a higher promiscuous behavior among single men relative to women.

2.1.2 HIV Knowledge

This study uses five variables to capture HIV related knowledge among men and women, these same variables have been widely used in other studies (Walque (2006), Aggarwal and Rous (2006), and de Araujo (2008)). Table 1 displays the descriptive statistics for these

variables. In the DHS survey, HIV knowledge can be separated in two broad categories: HIV awareness and HIV specific knowledge. Only the respondents that are aware of AIDS are also asked specific HIV related knowledge questions.

The awareness question asks respondents if they have ever heard of AIDS. It is surprising that 11% of men and 30% of women are not aware of AIDS. This large percentage can potentially put these individuals, specially women, more at risk of contracting the virus.

As explained above, only individuals that are aware of AIDS were asked more specific HIV knowledge questions. Even among these individuals, women scored lower when compared to men. When asked if the use of a condom reduces the risk of contracting HIV, 84% of men and ony 71% of women answered yes. This same pattern arose when respondents were asked if increasing the number of sexual partners, increases the chances of acquiring HIV, with 87% of men and 76% of women responding affirmatively.

The other two specific HIV related knowledge questions deal less with sexual behavior and more with HIV related stigma. Respondents were asked if sharing food with a HIV infected individual transmits the disease, where as "yes" response indicates that the individual knows that one cannot get infected by sharing food. The other question asked respondents if a healthy looking person can be HIV infected. Again, a larger percentage of men knew the correct answers in both questions relative to women. When coupling this poor knowledge of HIV among women with the low level of empowerment that the average Indian women has, the ability of women to convince men to engage in safer sexual practices is diminished (Pallikadavath, Sreedharan, and Stones (2006)).

2.1.3 Controls

Solomon, Chakraborty, and Yepthomi (2004) have indicated significant differences in HIV related knowledge and risky sexual behavior among different socioeconomic groups. Therefore, we follow Walque (2006), Corno and Walque (2007), and Agarwal, de Araujo, and Paudel (2010) and use very similar controls in our analysis.

The list of control includes: education levels, from no education to higher education; wealth, from the poorest quintile to the richest quintile; location of residence, urban or rural; marital status; single, married, or formerly married; age of respondents; religion, eleven categories (Hindu, Muslim, Christian, Sikh, Buddhist, Jain, Jewish, Parsi, Donyi Polo, no religion, and other). We also use controls for the State of residence, employment, and Caste.

2.2 Empirical Model and Average Partial Effects

In order to capture the degree in which HIV related knowledge is associated with risky sexual behavior, we estimate a binary response model[1] to investigate this association in men and women separately. Hence the general form of the equation we estimate is given by:

$$P(y = 1|k, X) = F(\beta k + \Omega' X), \tag{1}$$

where y is one of the four risky sexual behavior variables, k is one of the five HIV related knowledge variables, and X is the vector of controls. This paper is mostly interested in partial effects derived from the parameter β for these various different estimation exercises.

[1]This paper uses a probit model, however, results are robust to different specifications: logit and linear probability model.

It is well understood that the estimate of β might suffer from endogeneity bias due to either omitted variables or reverse causality. In the absence of reliable instruments, we rely on our controls to deter some of this potential misspecification. And following Walque (2006) we must interpret our results with caution.

Partial effects are usually calculated at the mean value of the controls; however, because most of the controls used in the study are qualitative, partial effects at the means are not appropriate. Instead, we estimate average partial effects given by:

$$APE_k = \frac{1}{n}\sum_{i=1}^{n}[F(\beta k_i + \Omega' X_i) - F(\Omega' X_i)]. \tag{2}$$

The estimate obtained from equation 2 above gives the average change in the likelihood of risky sexual behavior whenever individuals are more knowledgeable regarding HIV, controlling for socioeconomic characteristics and location of residence. We estimate 60 such relationships[2] and display the results on table 2. In the next section, we discuss the results.

3 Results and Discussion

Table 2 displays the average partial effects on risky sexual behavior of better HIV related knowledge. Hence, every estimate originates from a different equation. Before, we start reporting these results, we must reinforce that, as in Walque (2006), Corno and Walque (2007), and others, we are mainly reporting associations and not necessarily causal relationships. However, some would argue that the use of many relevant controls (Cameron and Trivedi (2005)), can potentially attenuate one of the sources of endogeneity - omitted

[2]In some models, we estimate equations for singles only as well.

variable bias.

In general, the results suggest that better knowledge does not necessarily decrease the likelihood of risky sexual behavior. While increased HIV related knowledge increases the likelihood of using condoms, it also increases the likelihood of pre-marital sex and decreases the level of abstinence. The effects on extra-marital sex are small and mostly insignificant. Most of these results are consistent with Agarwal, de Araujo, and Paudel (2010). Also, the effects of the controls on risky behavior is consistent with the literature[3].

Regardless of which knowledge variable is used, the direction of the association between knowledge and risky behavior does not change. However, these associations are much stronger for males relative to females. More specifically, awareness of HIV increases the likelihood of condom use by 5.1% in males and 2.6% in females. These same effects are much larger when the model is fit with only single individuals (17.1% and 10.7% respectively). Awareness also increases the likelihood of pre-marital sex by 11.4% in males and only 0.6% in females. Similar patterns are also present in the associations between more specific HIV related knowledge, for example, number of sexual partners, and risky sexual behavior.

It is important to notice that condom use does increase with better knowledge, however, for condom use to be an effective way to prevent HIV transmission, it needs to be used almost every time. And based on the very low levels of condom used reported in the data, it is possible to infer that condoms are not being used frequently. This suggests that the increase in pre-marital sex and the decrease in abstinence due to increased HIV related knowledge is possibly putting the Indian population more at risk despite the increases in condom use.

[3]Results not reported, but available upon request.

The fact that improved knowledge seems to exhibit potentially riskier behavior in females and more strongly in males is not necessarily a surprise. Eckel and Grossman (2008), in a review, have demonstrated, using experimental economics literature, two important behavioral characteristics with respect to risk. First, when individuals are better equipped with knowledge, it can lead to less risk aversion. Second, males, under a wide range of conditions, are less risk averse than females. We believe that the combination of these two results help explain most of our findings. Increased HIV related knowledge empowers individuals to possibly engage in riskier sexual practices (more pre-marital sex and less abstinence). These effects can be very different for males and females as males are not only more knowledgeable, but also less risk averse.

Also, these results, even if indirectly, suggest that condom distribution and informational campaigns are probably not very effective in promoting safer sexual behavior. In fact, these campaigns could be creating the opposite. However, our data does not have enough degrees of freedom to precisely infer this as no campaign data is available.

4 Conclusion

This paper investigates the degree of association between HIV related knowledge and risky sexual behavior in India. Three important results stem from the analysis. First, better HIV knowledge creates ambiguous effects on safer behavior, that is, even though better knowledge is positively associated with increased condom use, it is also positively associated with more pre-marital sex. Second, better knowledge has a stronger effect on the risky behavior of males. That is, with better knowledge, males are more likely than females to engage in

risky behavior. This result is consistent with some experimental literature reviewed in Eckel and Grossman (2008). Third, regardless of which measure of HIV related knowledge being used, the direction of the relationship between HIV related knowledge and any risky sexual behavior does not change.

If one of the goals of HIV campaigns is to promote better HIV knowledge in order to promote safer sexual practices, this paper leads one to conclude that this relationship is much more complex. That is, better knowledge can be associated with more risky behavior. This results is consistent with the body of literature that has investigated these effects, for example, Anderson (2011).

One shortcoming of the analysis is that it does not completely address the possibility of reverse causality. Hence, the results must be interpreted with caution. However, we believe that the main message of the paper is not compromised.

References

Agarwal, S., P. de Araujo, and J. Paudel (2010): "Does HIV/AIDS Related Knowledge Affect Men's Decision to Have Sexual Encounters with Commercial Sex Workers? Evidence from sub-Saharan Africa," Colorado College Working Paper Series.

Aggarwal, R. M., and J. J. Rous (2006): "Awareness and Quality of Knowledge Regarding HIV/AIDS Among Women in India," Journal of Development Studies, 42(3), 371–401.

Anderson, M. (2011): "The Impact of HIV Education on Behavior among Youths: A Propensity Score Matching Approach," Montana State University Mimeo.

Cameron, A. C., and P. K. Trivedi (2005): Microeconometrics: Methods and Applications. Cambridge University Press, 1st edn.

Chatterjee, P. (2003): "Spreading the Word About HIV/AIDS in India," Lancet, 361(9368), 1526.

Corno, L., and D. D. Walque (2007): "The Determinants of HIV Infection and Related Sexual Behaviors: Evidence from Lesotho," Policy Research Working Paper 4421.

de Araujo, P. (2008): "Socio-Economic Status, HIV/AIDS Knowledge and Stigma, and Sexual Behavior in India," CAEPR Working Paper.

Eberstadt, N. (2002): "The Future of AIDS," Foreign Affairs, 81(6), 22–45.

Eckel, C., and P. Grossman (2008): "Men, Women and Risk Aversion: Experimenal Evidence," Handbook of Experimental Economics Results.

Keshavan, K. (2007): "AIDS in India: When Denial Kills," Home Health Care Management & Practice, 20(1), 21–26.

Pallikadavath, S., C. Sreedharan, and R. W. Stones (2006): "Sources of AIDS Awareness among Women in India," AIDS Care, 18(1), 44–48.

Porter, S. B. (1993): "Public Knowledge and Attitudes about AIDS among Adults in Calutta, India," AIDS Care, 5(2), 169–176.

Solomon, S., A. Chakraborty, and R. D. Yepthomi (2004): "A Review of the HIV Epidemic in India," AIDS Education & Prevention, 16(2), 155–169.

Vicziany, M. (2001): "HIV and AIDS in India: Love, Disease and Technology Transfer to the Kamasutra Condom," Contemporary South Asia, 10(1), 95–129.

Walque, D. D. (2006): "Who Gets AIDS and How? The Determinants of HIV Infection and Sexual Behaviors in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania," World Bank Policy Research Working Paper 3844.

Table 1: Descriptive Statistics - HIV Knowledge and Risky Behavior Variables

	Males			Females		
	Mean	St. Dev.	Obs.	Mean	St. Dev.	Obs.
Risky Behavior Variables						
Condom Use	0.1012	0.3016	45,328	0.0716	0.2579	84,346
(singles only)	0.4260	0.4946	2,197	0.0737	0.2614	692
Pre-Marital Sex	0.1364	0.3432	28,474	0.0113	0.1060	30,652
Extra-Marital Sex	0.0135	0.1154	44,884	0.0022	0.0477	87,925
Abstinence	0.0533	0.2248	74,362	0.114	0.3185	93,861
(singles only)	0.3781	0.4849	4,876	0.8302	0.3754	6,084
HIV Knowledge Variables						
Ever Heard	0.8875	0.3159	74,362	0.7107	0.4534	124,374
Condom Use	0.8376	0.3687	65,940	0.6416	0.4795	88,350
# Sexual Partners	0.8778	0.3274	65,987	0.7604	0.4268	88,376
Sharing Food	0.7725	0.4191	65,969	0.7346	0.4415	88,352
Healthy Looking Person	0.7669	0.4227	65,993	0.6686	0.4707	88,382

Table 2: Risky Sexual Behavior and HIV Related Knowledge (Average Partial Effects)

HIV Knowledge Variables	Risky Sexual Behavior Variables							
	Males				Females			
	Condom Use	Pre-Marital	Extra-Marital	Abstinence	Condom Use	Pre-Marital	Extra-Marital	Abstinence
Ever Heard	0.051***	0.114***	0.006***	-0.009***	0.026***	0.006**	-0.001	-0.016***
	[0.0064]	[0.0100]	[0.0020]	[0.0028]	[0.0027]	[0.0022]	[0.0004]	[0.0022]
(singles only reg.)	0.171***			-0.016	0.107***			-0.024*
	[0.0543]			[0.0257]	[0.0394]			[0.0126]
Condom Use	0.048***	0.037***	0.007***	-0.007***	0.042***	0.005***	-0.001	-0.010***
	[0.0052]	[0.0063]	[0.0018]	[0.0023]	[0.0030]	[0.0016]	[0.0004]	[0.0022]
(singles only reg.)	0.139***			0.088**	0.016			-0.040***
	[0.0325]			[0.0210]	[0.0417]			[0.0132]
# Sexual Partners	0.028***	0.031***	0.0003	-0.005*	0.014***	0.002	-0.0003	-0.004
	[0.0058]	[0.0069]	[0.0019]	[0.0026]	[0.0034]	[0.0018]	[0.0004]	[0.0024]
(singles only reg.)	0.048			0.017	0.041			-0.018
	[0.0359]			[0.0229]	[0.0479]			[0.0144]
Sharing Food	0.017***	-0.007	-0.0007	-0.007***	0.014***	0.002	0.0003	-0.006***
	[0.0040]	[0.0056]	[0.0014]	[0.0021]	[0.0030]	[0.0019]	[0.0004]	[0.0023]
(singles only reg.)	0.075***			-0.028	0.040			0.015
	[0.0285]			[0.0176]	[0.0413]			[0.0136]
Healthy Looking	0.015***	0.017***	0.002	-0.005**	0.008***	-0.003*	-0.001	-0.006***
	[0.0040]	[0.0053]	[0.0014]	[0.0021]	[0.0027]	[0.0015]	[0.0004]	[0.0021]
(singles only reg.)	0.076***			-0.016	0.037			0.006
	[0.0275]			[0.0176]	[0.0398]			[0.0130]

Robust standard errors in brackets. ***significant at 1%, **significant at 5%, *significant at 10%.