

Knowledge of HIV/AIDS among Migrants in Delhi Slums

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The paper examines the extent of knowledge and awareness of HIV/AIDS among the slum dwellers in Delhi city in India and the factors affecting their knowledge.

Key words: India; HIV/AIDS; slums in Delhi; awareness and knowledge

Introduction

In the last decade, India witnessed a sharp increase in reported and estimated cases of both HIV (Human Immuno-deficiency Virus) and AIDS (Acquired Immuno-deficiency Syndrome). Though reported cases are far fewer, UNAIDS estimates indicate that there may be as many as three million individuals infected with the Human Immuno-deficiency Virus in India. There has been a steady increase in the reported prevalence of sero-positivity in all the states of India and in all the identified groups. While about 70-80 percent of all the infections are due to heterosexual contact, there has been an alarming rise in the infected cases due to infected blood products and among antenatal mothers, indicating the spread of HIV in the general population.

It is often argued, especially in less developed countries like India, that too much attention is being paid to HIV/AIDS to the detriment of attention to other diseases. But, there are some unique features of the epidemic that set it apart from other illnesses and conditions, and require a different set of strategies to deal effectively with prevention and control. We list below some of these features.

- (a) AIDS is almost always fatal, i.e. the probability of recovery is close to zero.

- (b) HIV spreads predominantly through unprotected and unsafe sexual relations, making it an outcome of predominantly private decisions.
- (c) The epidemic strikes the adult population mostly because of the behavioral nature of transmission, and therefore, affects the most productive segment of the society.
- (d) There are chances of multiple infected cases in one household; from one spouse to the other and from mother to child.
- (e) There is a long gestation lag between the time of infection and the appearance of the first opportunistic infection, when the individual is healthy.
- (f) Death is preceded by a fairly long period of illness, which could consist of several distinct opportunistic infections.
- (g) Treatment costs are very high.
- (h) HIV/AIDS is associated with a high degree of stigma and discrimination.

Given these unique features of the epidemic, the consequences of a severe epidemic for a resource-constrained and poor economy like that of India, as well as for individuals and households would be grave. This calls for urgent action now, rather than later. Since the primary mode of transmission is mostly via private actions, there cannot be any direct policy, either to prevent infection or to monitor it effectively. There can never be any foolproof control and prevention strategy that ensures that the infection

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does not spread through unsafe sexual practices. This is also true, though to a lesser extent, in the case of sharing infected syringes. This is not true of the other major mode of transmission, infected blood and blood products. It is possible, though costly, to ensure that all blood and blood products are safe. Under the circumstances, it is important to design the most cost-effective strategies at the outset. The only variable that such strategies can hope to influence is knowledge and awareness about the epidemic and its control. It is critical to impart correct information about HIV and AIDS, how HIV spreads, and how to protect oneself from getting infected.

The National Family Health Survey that was conducted among prime-aged females in India, had a brief module on knowledge of AIDS.¹ Based on this data, Balk and Lahiri² find that educated, wealthier, and urban women were more likely than other women to have heard of AIDS. That females are especially susceptible to infection, given their socioeconomic status in society, is by now a well-established fact, especially for developing countries like India. The other sub-groups that are hypothesized to be susceptible to infection are transport workers, defense personnel, migrant workers, etc.; in other words, any group that has high mobility due to their occupational characteristics, which results in long stay away from home. There are a few other studies available on India on the subject of awareness and knowledge^{3,4} that look at different population groups. This study is the first on knowledge of AIDS among slum dwellers in Delhi.

In Delhi, rates of HIV infection have shown a steady increase over the years. While there has been some emphasis in the recent past on IEC (Information, Education and Communication) activities among groups like truck drivers, it is our contention that it may be more important and cost-effective to look at larger and more permanent population sub-groups like slum dwellers.

A slum survey carried out in 1976-77 by the National Sample Survey indicated that about 32 percent of Delhi's population may be made up of migrants from neighboring states who settle in slums and shanty towns; this figure is likely to be even higher currently. While all the indicators of socioeconomic development, especially income, education and status of women, are adverse for this group, there is an

almost one-to-one correspondence between the slums and the informal sector. Other results on employment from this survey⁵ confirm the view that almost all of the employed respondents in these slums are working in the informal sector. Given their nature of employment and low socioeconomic status, coupled with very high rates of population growth in these slums, this group is potentially a high-risk group in terms of probability of infection.

Keeping these factors in mind, a survey was conducted in the capital city of Delhi, and the data from it has been used in this paper to examine the extent of knowledge and awareness of HIV/AIDS among these slum dwellers and the factors affecting their knowledge.

The organization of the paper is as follows: in the next section, we describe the survey and sampling framework; then, the empirical analysis and the results are presented; finally, we summarize the major findings and policy conclusions.

The Survey

To study the links between socioeconomic, health and migrant status generally, a survey was conducted in 1996 among 150 slum households from different parts of Delhi. These slum dwellers are all migrants from different states, with a residence span of at most 15 years in Delhi. All the adults (361) in these households were interviewed, and among other questions on socioeconomic status and health, a section on knowledge of HIV/AIDS was included. Men and women were also asked about their current sexual practices, especially whether or not they use condoms.

Before turning to the analysis, we give a brief description of the sampling procedure used to select the 150 households.

The basic document we used for our sampling strategy is a list of slum clusters (which gives the specific areas where the slums are located) provided by the Delhi Development Authority (DDA) for the year 1994. This is the latest document available which records the number of constituencies, the number of clusters in each constituency, and the number of slums in each cluster.

In order to select the 150 sample slum households, we used a three-stage stratified random sampling framework

as described below.

Delhi has been divided into seven zones on the basis of the geographical location of the 70 constituencies given in the DDA list; these are North, South, West, East, Central, North-East and North-West zones respectively.

Each zone has a large number of slum clusters, i.e. different locations, and each cluster in turn has a large number of slum households. Thus the sampling framework broadly comprised the following two steps: (1) selecting the required number of clusters from the total clusters in each zone, and (2) selecting the required number of households from these clusters.

To keep the sampling framework relatively simple, we decided to pick 50 clusters from the total number of clusters across all constituencies. To get the distribution of these 50 clusters across the zones, the number of clusters in each zone divided by the total number of clusters across all zones was calculated; this proportion was then multiplied by 50 to get the number of clusters to be picked from each zone.

The next step involved picking the actual clusters from each zone. Since each zone had a large number of clusters, there had to be a way for selecting specific clusters from each zone. This was done by selecting the clusters with the maximum number of slums in each constituency under a specific zone.

It was decided that 1000 slum households in total across all the clusters would be selected. This was done by using the list on distribution of slums across clusters. The first step was to calculate the proportion of slums in each cluster (i.e. the number of slums in a particular cluster divided by the total number of slums across all clusters in all the zones). This proportion was then multiplied by 1000 to get at the operational number of households to be picked from each cluster.

As mentioned earlier, the definition of a recent migrant is, 'one who has been in Delhi for 15 years or less'. Thus, this criterion was used as a screening device for the 1000 households. These 1000 households were screened by asking a simple question about the number of years the household has been in Delhi, and we found 469 households

that met the criterion.

Finally, 150 households were selected by taking the proportion of households that met the criterion in each cluster, over the total number of such households (469), and multiplying it by 150.

Empirical Analysis

The analysis of factors affecting knowledge of HIV/AIDS has been done in two parts. In the first part, we present summary statistics on knowledge about the infection/disease and its mode of transmission. In the second part, a probit analysis is done to isolate the factors that affect the probability of knowledge. The analysis was restricted to adults between the ages of 18 and 55.

(a) Summary Statistics on Knowledge of HIV/AIDS

The distinction between HIV, the virus, and AIDS, the complex set of conditions resulting from the infection, is often blurred in people's minds. To confirm this, the questionnaire asked the respondents whether they had heard of either HIV, or AIDS, or both. Table 1 shows the distribution of responses.

As Table 1 indicates, only 5 percent of the respondents had heard of HIV, whereas many more, 35 percent, had heard about AIDS. As few as 4 percent of the respondents had heard about both HIV and AIDS. In all, 44 percent of the individuals had heard about either HIV, or AIDS, or both, and 56 percent had not heard of either. Thus, a majority of the sample had no knowledge of HIV/AIDS, which is a serious finding in a country with at least three million infected people, and rising infection rates. The fact that almost no one had heard about HIV but some had heard about AIDS implies that only partial knowledge is being transmitted, which in turn has implications for the effectiveness of IEC (Information, Education and Communication) activities.

Table 1 *Knowledge of HIV/AIDS*

Variable	Percent
Heard about HIV	5
Heard about AIDS	35
Heard about HIV/AIDS	4
Not heard	56

Apart from having merely heard about HIV/AIDS, it is also important to understand the kind of knowledge that individuals have in order to be able to design effective interventions. The questionnaire asked those who had heard about HIV/AIDS, whether they thought it killed people. About 60 percent of all those who had heard about HIV/AIDS thought that the disease kills people. Though this percentage is quite encouraging, it still implies that a large number of individuals do not know the full implications of contracting the disease, and this makes the task of prevention more difficult.

Questions on the mode of transmission were asked of those who had heard about HIV/AIDS. The modes and the responses are indicated in Table 2.

Table 2 Knowledge about Mode of Transmission (all figures in percent)

Transmission	Yes	No	D/K
Sex	69	1	30
Blood transfusion	56	1	43
Mosquito bite	11	32	57
Kissing	26	20	54
Sharing utensils	17	23	60
Touching	8	29	63

A large number of people thought that kissing or sharing vessels transmits the 'disease'. While a large percentage did say that sex and blood transfusion were common modes of transmission, it is encouraging to note that the percentage who gave an emphatic 'no' are fewer than the percentage who said they did not know. This implies that the target group that one can hope to reach are those individuals who are unsure about the disease and how it spreads. It is easier to impart knowledge to individuals who are uncertain about what they know, than to those who have firm, but wrong beliefs.

(b) Determinants of Knowledge: Probit Analysis

As discussed above, effective intervention would require the policy-makers to know the determinants of knowledge. In the analysis below, using a probit model, we attempt to indicate the variables that may increase the probability of knowledge.

The individuals were asked whether or not they had heard

about either HIV, or AIDS, or both. If the answer to any of these questions was yes, the variable on knowledge y_i was equal to 1; else, it was equal to zero. Suppose, whether or not an individual has knowledge about the epidemic depends on the value of an index I_i^* . This index is a function of several variables, denoted by X_i . Thus for individual i ,

$$(1) \quad I_i^* = \hat{a} X_i + \hat{a}_i$$

Though we do not directly observe the value of this index, we do observe whether or not a person has knowledge. Let y_i denote the binary variable for knowledge. Thus,

$$(2) \quad y_i = 1 \text{ if } I_i^* > 0 \text{ and } y_i = 0 \text{ if } I_i^* \leq 0$$

From (1) and (2), the probability that a person has knowledge of HIV/AIDS can be written as:

$$\begin{aligned} \text{Prob}\{I_i^* > 0\} &= \text{Prob}\{y_i = 1\} \\ &= \text{Prob}\{\hat{a} X_i + \hat{a}_i > 0\} \\ &= \text{Prob}\{\hat{a}_i > -\hat{a} X_i\} \end{aligned}$$

$$(3) \quad = 1 - F(-\hat{a} X_i)$$

F is the standard normal cumulative distribution function of the form shown in Equation (4), which is distributed with a mean zero and a variance equal to 1.

$$(4) \quad F(-\hat{a} X_i) = \int_{-\infty}^{-\hat{a} X_i} \frac{1}{\sqrt{2\pi}} \exp(-t^2/2) dt$$

Thus, the log likelihood function can be written as in Equation (5) below.

$$(5) \quad L = \prod_{y_i=0} F(-\hat{a} X_i) \prod_{y_i=1} [1 - F(-\hat{a} X_i)]$$

Since Equation (5) is highly non-linear, maximizing this requires an iterative solution to estimate the coefficients.

The analysis considers the following variables as the likely determinants of knowledge of HIV/AIDS: age, sex, education, marital status, whether or not the person is working, income, ownership of radio, ownership of television, occupational status, and zone. Most of these variables have intuitive explanations as determinants, but the estimation below confirms which of these variables are important. Intuitively, age and education need little explanation: older and better educated individuals are likely to be better informed. There may also be gender differences

in the extent of knowledge because of education differentials, as well as exposure to the outside world from where the information is being received. Similar logic can apply to occupation and work status. Married individuals (most of whom had children in the sample), in addition to having sexual experiences, are also more likely to have visited a doctor or a health practitioner for child delivery, and therefore, it can be argued that they are more likely to have a few more sources of information about HIV/AIDS than unmarried individuals. Television and radio are two important media of communication in the modern world and the model tests whether these make a difference to the probability of knowledge. Finally, different areas of Delhi have different levels of development, and this has been included in the model below to ascertain whether this makes any difference to the probability of knowledge.

The occupations have been divided into five categories: trade, transport, services, manufacturing and casual labor. Also, Delhi has been divided into seven zones by the administration: North, North-East, East, South, West, North-West and Central, and these were used in the analysis.

The alternative specifications had tested whether or not these variables were significant in explaining knowledge. However, we report below the results that include all the variables, except income, without omitting the ones that were insignificant. It is important for the policy-makers to know the variables that are often thought to determine knowledge, but actually turn out to be not very important. A maximum likelihood probit, using the Newton-Raphson maximizing routine, was used to estimate these alternative models. In Table 3, we present the probit results: the coefficients along with the t-statistics (at 5 percent significance level) are reported in Columns 1, 2 and 3.

As the table indicates, the model fits the data very well; the probability of success in the sample is 0.43, whereas the predicted probability is 0.42. As for the variables, age and primary education are significantly negatively related to knowledge. Older individuals seem to know less about HIV/AIDS than younger respondents. This is an important finding because it indicates that (a) knowledge is best imparted at an early stage, and (b) beliefs and misconceptions are more difficult to shake off in relatively older individuals. Those with primary education or less are less likely to have

knowledge about the epidemic. This is consistent with the other finding that education is a key variable in controlling and preventing the spread of infection. Gender does not seem to be very important for knowledge, though the sign seems to indicate a negative relationship between being a female and having knowledge.

Table 3 : Probit Results on Knowledge of HIV/AIDS
 Dependent variable $y=1$ (Knowledge) $y=0$ (No knowledge)

Variables	1	dF/dX	2	dF/dX	3	dF/dX
Constant	0.36 (0.88)	-	0.46 (1.2)	-	0.39 (1.0)	-
Age	-0.02 (-2.7)	-0.009	-0.02 (-2.8)	-0.009	-0.02 (-2.7)	-0.009
Sex=1 if female	-0.25 (-1.2)	-0.10	-0.27 (-1.3)	-0.11	-0.28 (-1.3)	-0.11
Primary education or less	-0.79 (-4.6)	-0.31	-0.79 (-4.7)	-0.31	-0.79 (-4.7)	-0.31
Whether working	0.44 (1.7)	0.17	0.34 (1.6)	0.13	0.27 (1.2)	0.11
Owens radio	0.16 (1.0)	0.06	0.12 (.76)	0.05	0.16 (1.0)	0.06
Owens television	0.51 (3.1)	0.20	0.47 (3.0)	0.18	0.53 (3.2)	0.20
Married	0.12 (0.39)	0.04	0.14 (0.45)	0.05	0.10 (0.32)	0.04
Occupation - transport	-0.50 (-1.5)	-0.18	-	-	-0.37 (-1.2)	-0.13
Occupation - services	-0.32 (-1.3)	-0.12	-	-	-	-
Occupation - Manufacturing	0.22 (0.85)	0.09	-	-	0.36 (1.5)	0.14
Occupation - Casual labor	-0.10 (-0.28)	-0.04	-	-	-	-
Zone: North	-0.34 (-0.99)	-0.13	-0.42 (-1.2)	-0.15	-0.33 (-.97)	-0.12
Zone: North-East	1.1 (2.7)	0.40	0.99 (2.5)	0.37	1.1 (2.6)	0.39
Zone: East	0.69 (2.4)	0.27	0.55 (1.9)	0.21	0.66 (2.3)	0.26
Zone: South	0.02 (0.08)	0.007	-0.05 (-0.28)	-0.02	-0.02 (-0.08)	-0.006
Zone: West	0.19 (0.69)	0.08	0.19 (-0.28)	0.09	0.22 (0.81)	0.09
Zone: Central	0.46 (1.9)	0.18	0.34 (1.5)	0.14	0.45 (1.9)	0.18

Observed $p = 0.43$, Predicted $p = 0.42$

Whether or not the individual is working, does not significantly affect the results, though again the sign indicates that there may be a mild effect of working on knowledge in the positive direction; those who work are more exposed to outside influences and information, and may be better equipped to improve their knowledge about diseases and epidemics.

A very significant result is that the ownership of a television by the household, as opposed to that of a radio, seems to have an influence on knowledge of HIV/AIDS. This immediately brings out the need to use the power of the visual media as a tool for IEC activities. That the radio is less significant is also important, because it implies that standards of living and the basket of consumer goods have changed over the years. Even in the slums, owning a television (often jointly) is quite common, especially with a fall in the prices of older models in the recent past. Contrary to what many think, watching television is more common than listening to the radio in these slums.

None of the occupation categories seems to make any difference to the results; this is again consistent with the hypothesis that the informal sector is quite homogenized in the nature of employment it provides, as well as in the kind of workers who join various informal jobs.⁵ Though evidence from the other parts of the survey does indicate a positive link between some occupational classes and poverty, there may be other factors determining knowledge besides just income. That this is so can be gathered from the fact that both household and individual incomes were used on the right hand side, and they turned out to be highly insignificant both in terms of the magnitude of the coefficient, and in the significance levels.

In the zones, individuals from the East, North-East and Central Zones seem to be more knowledgeable than the rest. The Central Zone is the heart of Delhi and also the seat of the government, and therefore, more developed than the other areas. This might explain why individuals from this zone fare better. However, it is not yet clear why individuals from the East and North-East Zones are more knowledgeable. To do a thorough job of investigation, one needs to look at the presence of NGOs or other organizations that may have been active in these areas in IEC activities.

Since the underlying distribution is a normal distribution, interpretation of probit coefficients is not straightforward. For example, the coefficient on age in specification 5 is -0.02; this is to be interpreted as saying that each one-unit increase in age leads to increasing the probit index by -0.02 standard deviations. Since this is not intuitively clear, a transformation of the results in terms of changes in probability is more useful. The change in probability for a change in an independent variable is the height of the normal density at the mean score corresponding to the probability of success, multiplied by the coefficient of the independent variable.

For each of the three specifications, next to the column of the coefficients, we report the change in probability for an infinitesimal change in the explanatory variables. For the dummy variables among the explanatory variables, the numbers should be interpreted as the difference in predicted probability due to a change in the dummy variable from 0 to 1. The changes in probability are calculated at the predicted means of the independent variables.

The difference in the predicted probabilities, if the individual has primary education or less, and more than primary education, is 0.31 (first specification). This implies that the probability of knowledge will be 31 percent higher among those who have more than primary education. An extra year of age increases the probability by about 1 percent, implying that there may be a large difference in knowledge between a person in the mid-twenties and a person in the mid-thirties. Similarly, the presence of television increases the probability of knowledge by 20 percent. Finally, the East and North-East Zones seem also to have a large positive impact on the probability of knowledge.

Summary and Recommendations

The results show that there is very poor knowledge about both the disease and how it spreads among the slum dwellers of Delhi. This is despite significant investment in IEC activities by the State AIDS Cell under the overall supervision of the National AIDS Control Organization (NACO) over the past decade.

The probit analysis to study the factors that affect the probability of knowledge indicated that the probability is higher among younger, more educated individuals.

Ownership of television increased the probability markedly, and the zone where the individual resides also seems to affect his/her knowledge. Currently, there are a few messages on AIDS that the national channels show; there is scope to improve and expand these messages. The most popular among media, even among the slum dwellers, is no longer the radio, and the impact of television is far reaching.

Though, in India, a lot of emphasis has been placed in the past on women and their special vulnerability our analysis does not find this to be a strong factor. In fact, too much emphasis on women may be counter-productive and may shift the emphasis away from males who are often more in need of knowledge and education than women.

In the context of limited resources at the disposal of the policy-makers, it is important to use resources cost-effectively. Since infection rates seem to be rising unabated in India, it is critical to act fast and effectively to prevent HIV, and this can be done only by imparting knowledge; knowledge about the infection, about AIDS, how to prevent transmission, and how HIV is transmitted. Unfortunately, apart from the few studies mentioned above, there have not been any systematic studies done to assess the efficacy of the IEC strategies on the spread of the disease in India, and the rates of increase in infection seem to indicate that these strategies could not have made any significant dent.

Slum dwellers constitute a significant proportion of Delhi's population; these individuals are mostly migrants from neighboring and even far off states, and generally maintain regular contacts with their families outside Delhi. Low education and a generally low socioeconomic status

indicated by their employment in the informal sector, indicate that this group could be potentially a source of spread of HIV. That this danger is real is indicated by the low levels of knowledge in this group. The 1997 Policy Research Report of the World Bank⁶ argues for the need to reduce negative externalities of high-risk behavior by heavily subsidizing safer behavior among those most likely to contract HIV. Targeted interventions, using the right channels of education and communication, are the only way to effectively tackle the problem of increasing spread of the infection in such groups. Targeting a susceptible group like slum dwellers by spreading education beyond primary level, targeting older adults of both genders, and using the medium of television effectively, will go a long way towards this.

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