Arusyak Sevoyan
Victor Agadjanian
Center for Population Dynamics
Arizona State University

Men's Labor Migration and Sexually Transmitted Diseases among Rural Women in Armenia

Abstract

This study looks at the impact of male migration on STDs among women left behind, using a recent data form a survey of 1240 women in rural Armenia. The study uses self-reported diagnosed STDs and STD symptoms as outcomes of the analysis. The results of negative binomial and logistic regressions indicate that male labor migration increases the odds of having STDs and STD symptoms among women net of other social and demographic factors. The analysis of determinants of STD symptoms detects significant interactions of husband's migration status with household income.

Background and Conceptualization

The association between migration and sexually transmitted diseases (STD) has been studied for a long time. However, since both phenomena have developed into more complex concepts, no approach has been able to give a comparatively comprehensive explanation. The shift in the focus of the research on migration and STDs shows the development of the disease and increasing complex association with migration processes throughout the world. The most often studied sexually transmitted disease has been HIV since the late 1980's. The interest in HIV can be explained given a wide spread epidemic that is growing bigger involving more various groups every day.

The earlier attempts to explain both the roots of the epidemic and its association with migration usually included a geographical approach. Some researchers were mapping the high HIV prevalence areas and migration routes and destinations to see how both were distributed geographically. It was found that HIV was more prevalent in the areas of migrant labor concentration, or it was spread out along the routes truck drivers usually traveled (Hunt, 1989, Quinn, 1994). The disease was later transmitted migrant labor reserve areas extending the boundaries of the epidemic (Hunt, 1989). The approach that considered migration as a link between high prevalence areas and low prevalence areas contributing to the spread of the disease from the first to latter was no longer able to explain the migration-HIV association as it was not straightforward any more. Coffee et al. (2007) find that geographic connectivity affected the spread of HIV only in the early stages of the epidemic.

Decosas et al. (1995) hypothesize that mobility is an independent risk factor for HIV infection regardless of origin or destination. They suggest that the fact that population movements spread out HIV is secondary to the fact that certain types of migration, rooted in social disruption, cause the HIV epidemic. Three types of migration are considered as risk factors for the spread of HIV and those include labor seasonal migration, female migration usually resulting in sex trade and urban migration (Decosas et al., 1995). Others have found that it was the changing pattern of migration that affects the HIV epidemic (Lurie et al., 1994, Coffee et al., 2007). Since migrants' home visits have become more frequent as well as migrants' wives have been able to visit their husbands more often due to better transportation, the epidemic has grown out of control.

In order to explain the content of this association, high-risk behavior was suggested as a factor increasing the HIV risks of migrants (Anarfi, 1993, Brockerhoff and Biddlecom, 1999, Lagarde et al., 2003, Coffee et al., 2005, Mtika, 2007). Many studies have found that migrants were more likely than their non-migrant counterparts to engage in high risk sexual relationships with prostitutes, have two or more casual partners (Brockerhoff and Biddlecom, 1999, Lagarde et al., 2003, Coffee et al., 2005, Mtika, 2007), engage in commercial sex trade (Anarfi, 1993), or use alcohol or IV drugs (Yang et al., 2007, Buckley, unpublished). Migrants are believed to involve in HIV high risk activities as a product of lax social control and social isolation. The migrant selectivity approach explains this behavior with the fact that younger, single males are usually selected into migration processes and they are more likely to engage in this kind of behavior (Yang et al., 2007). However, there is also evidence showing that migrants are not more likely to engage in high-risk behavior than non-migrants (Collinson et al., 2006, Mundandi et al., 2006). Moreover, they have increased perception of risks, which may decrease their risks of infection (Collinson et al., 2006).

The newest shift of the focus in HIV-migration research has been the studies of partners left behind. With the increased return migration, migrants' partners' increased HIV risks have become the center of dicsussion. However, the data on the partners of migrants have shown no significant association between HIV status and having a migrant partner (Lurie et al., 2002). Instead, Lurie et al (2002) found that the risks of women were related to the number of partners. The further analysis of their data actually revealed that both migrant men and non-migrant women were more likely to get infected outside of the marriage independent of husband's migration status (Lurie et al., 2003). The same study

also found that in one third of discordant couples, non-migrant females were the one to carry the disease. These findings open a new field of discussion as migrants may face increasing risks of being infected by their partners along with the risks to be infected from their own high-risk behavior. However, the risks of and from partners of migrants are still a growing area and needs to be studied more.

The HIV epidemic and migration processes in some African settings have been comparatively well discussed as these countries have been most affected by the epidemic. Much less researched have been the countries known as the "second wave" of the HIV epidemic with increasing number of infected people. Former Soviet Union countries are among the "second wave" with high rate of circular migration to Russia and Ukraine that recently have faced rapid increase in HIV/AIDS (Buckley, unpublished). Though the number of HIV infected individuals is still comparatively low, it tends to increase. Since migration is an important labor force for males in the area, the countries are at high risk of facing a rapid growth of the HIV epidemic. The STD rates are already high in the area and according to some sources are said to be skyrocketing (Kelly and Amirkhanian, 2003).

The bigger the epidemics grow, the more difficult it is to fight against them or prevent them from further spreading. The HIV epidemic needs to be studied in the "second wave" countries while it is still in its early stage. The social and behavioral characteristics of those who have higher risks of HIV need to be understood in order to be able to develop intervention strategies while the situation is manageable. The experience of other countries shows that there is a strong relationship between STDs or its symptoms and HIV especially when STDs take the form of ulcerations and lesions (Hunt, 1989,

Lurie et al., 2002, Lurie et al., 2003, Lurie et al., 2007, Yang et al., 2007). Therefore, in the countries with still low HIV rates but high STD rates, the association between migration and HIV can be studied through STDs or their symptoms.

Data and Methods

The data for this study come from a survey on Labor Migration and STI/HIV Risks conducted in rural Armenia in June 2007, at the height of out-migration season. Armenia is one of the post-Soviet Union countries that gained independence in 1991. It is located between Turkey, Georgia, Iran and Azerbaijan. The population of the country is slightly less than 3 million. The collapse of the Soviet Union, along with the military conflict with Azerbaijan in early 1990's, caused severe economic decline and massive emigration from the area. By mid-1990's the economic conditions have stabilized through privatization and international funding. Despite the economic growth and the improvements in the social life of the population, the migration rates are still high.

According to Gevorkyan et al. (2006) two patterns of migration emerged since late 1980's and early 1990's: permanent emigration abroad to the United States and Europe and seasonal migration to the neighboring countries of the former Soviet Union. The first wave of emigration started as a result of the earthquake in 1988, the second wave of massive emigration was the result of the war in Nagorno Karabakh. Later, the collapse of the Soviet Union and the economic decline caused additional emigration from the country.

The most popular destination for labor migrants are Russia and CIS countries as there are no visa regime, language obstacles and there are trade relations between these countries. The percent of labor migrants arriving in Russia and other CIS countries is

about 90% (Gevorkyan et al., 2006). Statistics have shown that the majority of Armenian labor migrants in the US and Europe are from Yerevan, the capital of Armenia, while the majority of labor migrants in Russia and other CIS countries are from rural areas. The statistics has also shown that the ratio of women migrants to the US and Europe is much higher than that of men. However, only half of women leave the country in search of job (Gevorkyan et al., 2006).

Among other consequences, seasonal labor migration is believed to put the HIV/AIDS rates at risk in Armenia. The main way of HIV/AIDS transmission used to be through IV drug addicts in the area. However, increasing numbers of new HIV infections are transferred through heterosexual sexual relations. Though HIV/AIDS rates are still low (HIV prevalence rate was 0.1% in 2003), the number of infected with other sexually transmitted diseases is much higher and is steadily increasing (UNAIDS/WHO, 2006). The data for this study come from a survey conducted in 31 villages in one marz (province) that is believed to have among the highest rates of labor migration and STD prevalence in the country. A total of 1240 women of reproductive age married to migrants and non-migrants were randomly selected from the village residential rosters. The sampling procedure was designed so as to assure a balanced representation of the two migration categories. The survey questionnaire included questions on socio-demographic and economic characteristics, women's and their husbands' work history, reproductive history, and gender attitudes. A separate module of the questionnaire focused on STDs: women were asked whether they had had any of the seven most common symptoms of STDs and whether they had ever been formally diagnosed with and treated for an STD.

Statistical models

To study the impact of migration on the diagnosed or hypothetical sexually transmitted diseases Logistic regression and negative binomial regression were used. The models were fitted using STATA and SAS computer programming. All the models control for random effects.

The probability of diagnosed or hypothetical STDs. The data include diagnosed diseases, however, this study does not primarily rely on the reporting of diseases as in many cases women are not able (or not willing) to get checked for STDs for economic or other reasons. Therefore the reporting of STDs was complemented with a syndromatic approach by fitting models predicting the self-report of symptoms typical of STDs. The first outcome variable is a dichotomy coded as 1 if women report having at least one STD symptom in last 12 months, and 0 otherwise. The model was fitted using logistic regression.

However, this dichotomy might not be a good indication of an actual STD as it will treat women who report accidental symptom(s), not necessarily related to STD, as being at risk of an STD. To address this issue another outcome variable including all the self-reported symptoms was created. The higher the number of self-reported STD symptoms, the higher the possibility of STD risks. Thus, the next dependent variable is the number of self-reported STD symptoms in the past year. The negative binomial regression was used for this model. Although, the actual diagnosed STD reports might not represent the actual rate of STDs in the area, the probability of actual disease was also modeled to compare with the results form other models. The dichotomy whether or not a woman was diagnosed with an STD in the past three years was used as another outcome.

If they have been diagnosed at least once with any STD in past three years it was coded as 1, and 0 otherwise.

The main predictor in the analysis is husbands' migration status. The husband that working abroad at the time of interview, or who had been away for at least three months since the beginning of the year is defined as migrant and coded as 1. Those who were present or working out of village but in the country are defined as non-migrants and coded as 0. Overall, 43.9 percent of interviewed women were married to migrants, and the rest 67.1 percent were married to non-migrants. All three models, with above mentioned STD/symptom outcomes, control for individual-level socio-demographic characteristics and village level variables. The individual-level control variables include women's age (linear and squared) and the difference between husbands' and wives' ages. The quadratic age parameter will control for the changing pattern of sexual activity and fertility as women age. The models also control for women's education, which is treated as dichotomy with vocational and higher education coded as 1 and secondary and less education coded as 0.

To control for reproductive health and behavior the models include the number of children women have and if they have ever had an abortion as a dichotomy (ever had=1, never had=0). On the one hand, induced abortions are believed to be used as a contraceptive method (Todda, 2006), which indicates unsafe sex practices between the couples that in its turn may result in transmission of sexually transmitted diseases. Some findings indicate that the history of induced abortions is significantly associated with syphilis (Bongaerts, 2001). Thus, controlling for abortions indirectly controls for

unprotected sexual practices and of hypothetical positive association with the higher probability of having an STD/symptom.

The statistical models also include a few family-level variables. Co-residence with parent(s) in-law is a dichotomous variable in the models, coded as 1 if the family lives with at least one parent in-law. Co-residence with in-laws is considered to be a proxy for social control, as those who live with parent(s) in-law will have less opportunity for extramarital relationships and will be at lower risks of STDs. Another family-level predictor is the monthly family income, which is included in the models as log of income.

The village-level controls include village population size, which is another proxy for social control. The bigger the population, the more anonymity there is and thus less social control over women's behavior. The average driving time to the nearest hospital controls for the accessibility of the healthcare for the women.

Results

Table 1 summarizes the distribution of outcome and predictor variables by husband's migration status. The distribution of outcome variables by migration status of the husband shows that two groups are quite different. About 68 percent of women married to migrants have had at least one STD symptom in the 12 months prior to the survey, compared to about 63 percent of women married to non-migrants. Moreover, migrants' wives report more STD symptoms on average in the last year than women with non-migrant husbands by about 0.2. The difference between the two groups of women is more obvious when we compare the diagnosed STD rates. More than 10 percent of women with migrant husband have been diagnosed with an STD in last three years,

whereas twice as less (~5%) women with non-migrant husband have had a diagnosed STD during the same period. The big difference in the latter, however, may be due to underling social and economic differences between the groups rather than to the difference in health outcomes.

The bigger is the gap between the two groups when it comes to women's opinion of husbands' unfaithfulness. The majority of migrant's wives think that it is very likely or possible that husband had a sexual intercourse with another woman in last 6 months and only about 10 percent of women with non-migrant husbands believe in their husbands' infidelity.

Table 1. Definition and distribution of individual-level dependent and independent variables by husband's migration status.

	Migrant	**Non-Migrant**
Outcomes		
Had an STD symptom at least once in last 12 months (%)	67.7	62.5
Number of STD symptoms in last 12 months (mean)	1.56	1.35
Had an STD at least once in last three years (%)	10.5	4.5
Woman's opinion of husband's infidelity in past 6 months (%)		
Very likely or possible	54.6	9.91
Very unlikely, impossible or does not know	45.4	90.09
Predictors		
Woman's age (mean)	31.75	31.02
Age difference between husband and wife	5.45	5.24
Woman's education (%)		
Secondary or less	72.1	63.9
Vocational or higher	27.9	36.1
Number of children (mean)	2.24	2.23
Ever had an abortion (%)	62.68	58.91
Number of abortions woman ever had (mean)	2.15	1.85
Co-residence with in-laws (%)		
Lives with in-law	64.2	67.1
Does not live with in-laws	35.8	32.9
Monthly income of the household (mean)	282.1	232.5

Most of the demographic characteristics of women with migrant and non-migrant husbands do not differ much. The mean age of women for both groups is about 31 and they are about 5 years younger than their husbands on average. The average number of children is about 2 and does not differ between the groups. However, women with migrant husbands have lower education on average, as about 28 percent of them have vocational and higher education, compared to about 36 percent of women with non-migrant husbands. Women married to migrant have higher rates of abortion by about 4 percent as well as more abortions on average than their counterparts married to non-migrants. Slightly higher percent of the women with non-migrant husbands is living with their parent(s) in-law compared to migrant households. This difference might be related to better economic conditions of migrant families who are more possibly to afford buying a separate house than non-migrant households. This can be partly approved by the distribution of income by the migration status. The average monthly income is higher for migrant households than for non-migrant households by about $50 on average.

The probability of STD/symptoms and migration. The results of multivariate analysis of the probability of STDs/symptoms are summarized in Table 2. The results are presented as odds ratios. Model 1 presents the association of the main predictor with the outcome variables. The results indicate that for all three outcomes husbands' migration has a significant impact and is positively associated with the probability of STD/symptoms and increases the number of self-reported STD symptoms. When the controls are added to the models (Model 2) the results slightly differ for each outcome. In section A the effect of husband's migration becomes marginal when we control for socio-demographic variables. The stronger predictors of having an STD symptom in last 12

months are having an abortion and the number of children, both of them increasing the probability of having a symptom. Women's education and family income have marginally significant effect on the outcome. While having vocational and higher education decreases the odds of having an STD symptom, income is positively associated with probability of an STD symptom.

In section B husband's migration status is still a strongly significant predictor of the number of symptoms after the control variables are added to the model. The coefficient is slightly smaller, but it is still positively associated with the odds of having an additional symptom. Among other significant predictors are women's education, having had an abortion and time to reach the nearest hospital. Having vocational and higher education decreases the odds of having an additional symptom, however having an abortion has a positive effect on the outcome. The effect of the time to hospital is very small, but counter-intuitive, as an increase in time to hospital is associated with a decrease in the odds of having an additional symptom. This means that time to the nearest hospital is not indicating the accessibility of the healthcare, but rather has more complex association with the number of STD symptoms.

Table 2. Odds ratios for the models of the effects of husband's migration status on the probability of ST diseases and symptoms among women.

	A. Had at least one STD symptom in last 12 months		B. Number of symptoms in last 12 months			C. Had an STD at least once in last 3 years	
Predictors	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**
Individual-level predictors							
Husband's migration status							
Husband is a migrant	1.299*	1.262†	1.177**	1.141**	0.516*	3.073**	3.127**
Husband is not a migrant (Ref.)	1.0	1.0				1.0	1.0
Woman's age		1.016		1.039	1.042		1.085
Woman's age^2		0.999		0.999	0.999		0.999
Husband – wife age difference		1.017		1.006	1.006		0.966
Woman's education							
Secondary or less (Ref.)		1.0					1.0
Vocational or higher		0.789†		0.859*	0.862*		0.809
Abortions							
Ever had an abortion		1.696**		1.399**	1.397**		2.685**
Never had an abortion (Ref.)							
Number of children		1.249*		1.046	1.046		1.023
Co-residence with in-laws							
Lives with in-laws		1.083		1.034	1.045		1.423
Does not live with in-laws (Ref.)							
Household income (Log)		1.158†		0.979	0.951		1.534**
Migrant*Income					1.166*		
Village-level predictors							
Driving time to the nearest hospital		0.984		0.990*	0.990*		1.000
Village population size		1.000		0.999	0.999		0.999
Number of cases				1238			

Significance level : ** - $p < 0.01$; *- $p < 0.05$, † - $p < 0.1$.

In Model 2 of section C we can see that the husband's migration still increases the odds of having an STD in the last three years by about three times even after controlling for individual-level and village-level variables. Ever having an abortion is another significant predictor of having an STD as it was the case in symptomatic approach. If women have ever had an abortion it increases the odds of having an STD by about 2.6 times. What is different however in this model is that income has a significant effect of having an STD. Each unit increase in log of income is associated with about 53% increase the odds of having an STD. At first this association might seem counter-intuitive, as the wellbeing of a person is an indicator of a better health. However, as the outcome variable represents diagnosed STDs, we should assume that better economic conditions create more chances of seeing a doctor and being diagnosed than those who have less means.

In Model 3 of section B the interaction of migration status and log of income is added to the model. The interaction term was not significant and did not add much to the explanation of other two outcomes (results not shown in the table). However, for the outcome the number of symptoms it reveals interesting patterns. When we add the interaction to the model, the effect of migration status still keeps its statistical power of explaining the number of symptoms, however it changes its direction. According to the results in Model 3, migration status of the husband is itself negatively associated with the number of symptoms, however when in combination with income it increases the odds of having an additional STD symptom, as the statistically significant coefficient of the interaction term indicates.

Conclusion

In the beginning of the discussion of the association between migration and the spread of HIV/STDs the main focus was on the migrant laborers. However, as the epidemic grew and the migration processes became more complicated the focus of interest moved from migrants to their long-term partners. The literature on the latter is not only not comprehensive but also contradictory. While some studies find evidence for the significant association between migration and the spread of HIV among the partners left behind, others find that multiple partnerships, rather than having a migrant partner, predict the HIV status. Less studied is the spread of the epidemic in the developing countries of the "second wave" of HIV/AIDS. These countries already have a high rate of STDs, which have been found to be strongly associated with HIV, and circular migration.

To add to the literature on the association between STDs and migration this study focused on the association of men's circular migration and STD/symptoms among women. The results of the analysis found evidence for the positive association between migration and STD/symptoms among women. Women married to migrant laborers are more likely to be diagnosed with an STD or have an STD symptom, than their counterparts married to non-migrants. However, the association is not straightforward. Some of the results of this study indicate that migration itself net of other factors might have a negative effect on the STD symptoms. It might be explained by fewer sexual contacts for the married couples with a migrant partner. However, migrants with higher incomes increase the STD risks for their partners, although, the net effect of income is also negative.

Therefore, high income provides different opportunities for women with migrant and non-migrant husbands. While it might mean better access to the healthcare for women with non-migrant husbands, for migrants' partners it might expose to higher risks of STDs as migrants with higher incomes are more likely to engage in commercial sex or other high risk behaviors than migrants with lower income or non-migrants. These results add to the literature and findings from different studies that migrants are more likely than non-migrants to engage in HIV high risk behaviors (Anarfi, 1993, Brockerhoff and Biddlecom, 1999, Lagarde et al., 2003, Coffee et al., 2005, Mtika, 2007). However, as not all the migrants but those with higher income create more risks for their partners, the future studies should pay closer attention to the economic context of migration in regard to STD/HIV.

The direction of the transmission of the diseases has been another controversial issue in the discussion of HIV/STDs and migration. Some studies indicate that partners of migrant laborers are not more likely to be infected, whereas others find evidence for that. Moreover, some studies have found that non-migrant partners of migrant laborers are the ones to be infected with an STD/HIV, while their partners do not carry the disease. Though the results of this study provide evidence for higher prevalence of STDs among women left behind, the direction of transmission of the disease remains unclear due to the limited data. In the context of Armenia statistics have shown that the rates of HIV infected men is much higher than that of women (UNAIDS/WHO, 2006). However, to answer the question if women left behind are more likely to get infected outside the marriage or from their husbands more research is needed. It is important to find out

STD/HIV high-risk groups as well as the routes of transmission of the disease to determine the target groups for social policies.

References

Anarfi J.K. (1993). Sexuality, migration and AIDS in Ghana: A socio-behavioral study. *Health Transition Review,* Vol. 3, Supplementary Issue 1993 1-22.

Bogaerts, J, Ahmed, J, Akhter, N, Begum, N, Rahman, M, Nahar, S, Van Ranst, M. and Verhaegen, J. (2001). Sexually transmitted infections among married women in Dhaka, Bangladesh: unexpected high prevalence of herpes simplex type 2 infection. *Sexually transmitted Infections*, 77, 114-119.

Brockerhoff, M., Biddlecom, A.E. (1999). Migration, Sexual Behavior and the Risk of HIV in Kenya. *International Migration Review*, Vol. 33, No. 4, pp. 833-856.

Buckley C.J. HIV/AIDS in the Caucasus: Migration as a Socio-Cultural Component of Women's Risk Settings: Preliminary Conference Draft. http://www.wcfia.harvard.edu/conferences/demography/papers/Buckley2.pdf.

Coffee, M.P., Garnett, G.P., Mlilo, M., Voeten, H., Chandiwana, S., Gregson, S.(2005). Patterns of Movement and Risk of HIV Infection in Rural Zimbabwe. *JID*:191 (Suppl 1), S159 – S167.

Coffee, M., Lurie, M.N., Garnett, G.P. (2007). Modeling the impact of migration on the HIV epidemic in South Africa. *AIDS*, 21:343–350.

Collinson M.A., Wolff B., Tollman S.M., Kahn K. (2006). Trends in Internal Labor Migration from Rural Limpopo Province, Male Risk Behavior, and Implications for the Spread of HIV/AIDS in Rural South Africa. *Journal of Ethnic and Migration Studies,* Vol. 32, No. 4, May 2006, pp. 633-648.

Decosas, J., Kane, F., Anarfi, J.K., Sodji, K.D.R., Wagner, H.U (1995). Migration and AIDS. *The Lancet,* Vol. 346, 826-28.

Gevorkyan, A., Mashuryan, K. and Gevorkyan A. (2006). Economics of labor migration from Armenia: a conceptual study. Prepared for the Fourth International AIPRG conference

Hunt C.W. (1989). Migrant Labor and Sexually Transmitted Disease: AIDS in Africa. *Journal of Health and Social Behavior*, Vol. 30, No. 4, pp. 353-373.

Kelly, J.A. and Amirkhanian, Y.A. (2003). The newest epidemic: a review of HIV/AIDS in Central and Eastern Europe. *International Journal of STD & AIDS*. 14(6): 361-371.

Lagarde, E., Schim van der Loeff, M., Enel, C., Holmgren, B., Dray-Spira, R., Pison, G., Piau, J.P., Delaunay, V., M'Boup, S., Ndoye, I., Coeuret-Pellicer, M., Whittle, H., Aaby,

P. (2003). Mobility and the spread of human immunodeficiency virus into rural areas of West Africa. *International Journal of Epidemiology,* 32:744–752.

Lurie, M., Harrison, A., Wilkinson, D., Abdool Karim, S. (1997). Circular migration and sexual networking in rural KwaZulu/Natal: implications for the spread of HIV and other sexually transmitted diseases. *Health Transition Review,* Supplement 3 to Volume 7, 1997, 17-27.

Lurie, M.N., Williams, B.G., Zuma, K., Mkaya-Mwamburi, D., Garnett, G.P., Sturm, A.W., Sweat, M.D., Gittelsohn, J., Abdool Karim S.S. (2003). The Impact of Migration on HIV-1 Transmission in South Africa: A Study of Migrant and Non-migrant Men and Their Partners. *Sexually Transmitted Diseases,* Vol. 30, No. 2 149- 156.

Lurie, M.N., Williams, B.G., Zuma, K., Mkaya-Mwamburi, D., Garnett, A.W., Sweat, M.D., Gittelsohn, J., Abdool Karim S.S (2003). Who infects whom? HIV-1 concordance and discordance among migrant and non-migrant couples in South Africa. *AIDS,* 17:2245–2252.

Mtika, M.M. (2007). Political economy, labor migration, and the AIDS epidemic in rural Malawi, *Social Science & Medicine*, 64 (2007) 2454–2463.

Mundandi, C., Vissers, D., Voeten, H., Habbema, D., Gregson, S. (2006). No difference in HIV incidence and sexual behavior between out-migrants and residents in rural Manicaland, Zimbabwe, *Tropical Medicine and International Health,* v. 11 no 5 pp 705–711.

Quinn, T.C. (1994). Population Migration and the Spread of Types 1 and 2 Human Immunodeficiency Viruses. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 91, No. 7., pp. 2407-2414.

Todda, C.S, Alibayevab, G., Sanchezc, J.L., Bautistac, C.T., Carrc, J.K., Earhartd, K.C. (2006). Utilization of contraception and abortion and its relationship to HIV infection among female sex workers in Tashkent, Uzbekistan, *Contraception*, 74, 318– 323.

Yang, X., Derlega, V. J., Luo, H. (2007). Migration, behavior change and HIV/STD risks in China. *AIDS Care*, 19(2): 282-288.

UNAIDS, WHO (2006). Epidemiological fact sheets on HIV/AIDS and sexually transmitted diseases.