Seasonal migration, HIV risk perceptions and condom use in rural Ghana[1]

Nkwanta District, Ghana

Introduction

Temporary or cyclical seasonal labor migrants in sub-Saharan Africa have been described in social science and anthropological research as 'bridge populations' for the HIV epidemic in rural areas. (Coast, 2005) Typical scenarios described by researchers are truck drivers, temporary mining communities and commercial sex workers as possible at-risk migrant groups that are more vulnerable to HIV infection. The frequent hypothesis is that the movement of migrant populations increases sexual network opportunities for having an infected partner. As migrants return home to their rural communities and partners, they spread the disease to previously low endemic areas. In short, migration in and of itself is widely considered to be a predisposing factor that increases risk of HIV infection.

In addition to rural migration theories, other studies have sought to prove that socio-economic factors such as education, wealth, literacy and income are negatively associated with HIV risk. (see Brockerhoff and Biddlecombe 1998 for review) Other proximate determinants of HIV risk, according to the literature include: age at first sex onset, number of partners, condom use, male circumcision, age, gender, ethnicity, and STI prevalence. However, several studies have shown contradictory results for the degree and direction of these determinants on actual statistical risk of HIV among rural migrant communities. It is impossible, therefore, to conclude with a general demographic model of what the exact determinants are and to what extent they are related to incidence rates in rural areas. Community and individual risks are in fact very much dependent on several confounding and often complex factors involving both cultural and anthropological contexts.

As an example, the Maasai of rural Tanzania are a very secular culture and tend only to have sexual relations with members of their own tribe. Since men are the majority of rural-urban migrants, they arrive in urban centers to find a dearth of sexual partners belonging to their ethnicity. In a recent study, only 5 percent of male Maasai in urban centers reported sexual partners outside of their rural home town. (Coast, 2005) Despite a highly promiscuous life-style

[1] Acknowledgements must be made to USAID, DANIDA and the Ghana Dutch partnership for providing funds that either directly or indirectly funded the contributing primary research and data collection. To Dr. James Phillips, the Population Council and the Mellon Fellowship program for providing the mentorship and mechanism for my 1.5 year fieldwork in Ghana. And above all to Dr. J Koku Awoonor-Williams, the Nkwanta Health Development Centre, its staff and the stakeholders of the Partnership for Rural HIV/AIDS Communication. Without their support, guidance and assistance, this research study and many others would not have taken place.

of unmarried men in rural areas, urban migrants report fewer instances of having a casual partner, as well as fewer partners on average than their rural counterparts. This study was not able to produce comparative prevalence and incidence rates for urban migrants and rural non-migrants, however other studies have shown that the Maasai in Tanzania among women attending antenatal clinic have rates slightly below the total national average of 6%. (Coast, 2005)

Mark Lurie's 2006 study in KwaZulu-Natal, South Africa, tests associations between HIV seropositivity and intervening socio-economic determinants for rural male migrants. Although he restricts the investigation to male migrants, he tests the seropositivity of his respondents as well as their female partners residing in the home town. Result findings show that in discordant couples with only one partner affected, roughly 1/3 of the infected partners were women. The article stresses the necessity of analyzing migration as a two way street, not only those that are migrating are at increased risk, but also the partners they leave behind.

Brockerhoff and Biddlecombe (1998), analyzed migration data from the Kenya DHS. They discovered that women traveling from one rural location to another exhibited higher rates of risky sexual behavior (1.71 greater odds) than rural women who do not migrate. Conversely, women who migrated to an urban area had reduced risky behavior than urban women who hadn't migrated to their current residence. Despite their original theory that migrants are inherently more risky due to the willingness to take on risks such as migrating to an unfamiliar place and willingness to separate from a spouse at home, the study showed that the majority of migrant women were actually not separated from their spouse but had perhaps migrated in order to join their partner. In general, education was associated with a decreased likelihood of risky sexual behavior, and rural women who did not own land were almost three times as likely to exhibit risky sexual behavior. Besides these two socio-economic factors, they concluded that the origin and destination of migrants were more relevant determinants of risky behavior than simple migration status. Most importantly, separation from a partner or spouse was one of the main influential factors in determining risky behavior, a status which can be independent of migration.

The majority of research findings in sub-Saharan Africa, generally has shown that lower education, literacy and wealth result in higher self-perceptions of HIV risk and general low use of condoms. In a rural setting, however, the more isolated, secular and marginalized tribes living in homogeneous communities or villages have conversely been shown to have a reduced sense of risk for infection. These communities also may exhibit relatively lower socio-economic status than more urban or rural town populations that are seen as more vulnerable to infection from 'outsiders'. A valid hypothesis, therefore, might be that higher levels of education and socio-

economic characteristics may in fact increase one's HIV risk in rural areas, but decrease the same risks among urban residents.

Maharaj and Cleland (2005) report findings that show higher levels of education and socio-economic characteristics increase risk for HIV among combined sub-samples of rural and less educated, urban and more educated and an intermediate group of educated rural and non-educated urban populations. They report that risk perception was more than twice as high among rural uneducated males than for the educated urban (25% vs. 10%). However, because of their categories of analysis, it is not possible from this study to differentiate between the effect that education has in rural areas as compared to its effect in urban communities.

Bloom, et al (2006) carried out a very comprehensive study in a rural Tanzania district using a demographic surveillance system and an open cohort demographic and epidemiological survey with a sample size of over 5,000. For both men and women, age-adjusted odd ratios imply that greater levels of household wealth accumulation, and education attainment increased the likelihood of being infected with HIV in the rural district. Other factors for rural men that determined risk were marital status for those who were widowed, divorced or separated, multiple sexual partners, employment as a trader or professional, and those who received at least five injections during the year. Results for women were similar, except that the presence of an STD symptom increased chances of HIV+ status, but not for men. Possibly due to the correlation between condom use in the past year and multiple sexual partners, any condom use among men was highly associated with being HIV positive.

The study also found that rural communities with limited socio-economic activity that were at a greater distance from the nearest town had significantly reduced HIV prevalence than communities near or in a trading center. Likewise, communities with relatively higher rates of migration or geographical mobility among its members had greater prevalence. The authors concluded from a multivariate model that individual migration was not significant, whereas the overall level of migration within the community of residence was a determinant that increased the likelihood of an individual's seropositivity.

In summary, all of these studies in conjunction show that the association between migration and HIV risk is definitely not one dimensional and that there are several intervening variables that affect both individual and community-level risk factors. Due to the confounding and complex relationship between migration, rural residence and socio-economic status, it is necessary to provide a broader picture that includes both anthropological and cultural aspects of local understandings and meanings of HIV transmission, risk, prevention and attitudes towards

'protected sex.' This context is best described with qualitative field observations to give a more relevant understanding of the interactions as depicted in the available demographic data.

This study presents field observations during my 2003-04 Mellon Fellowship, as well as survey results among women aged 15-49 from a rural district, Nkwanta of the Volta region in Ghana. It includes socio-economic background characteristics, seasonal migration patterns, HIV/AIDS knowledge, perceptions of risk and condom use as part of a larger survey designed to evaluate a national Community-Based Health Planning and Services (CHPS) program. Starting in 1998, Nkwanta introduced CHPS as a new model of health service delivery in the district by posting resident nurses in remote rural communities. In the CHPS model, nurses and volunteers travel to villages in their catchment area to provide integrated health care including by canvassing households door-to-door in addition to close-to-client static health service delivery.

The purpose of this paper is 1) to discuss the associated dynamics between migration and HIV risk as described in previous research relating to sub-Saharan Africa; 2) to provide local understandings of disease transmission, sexual relations and attitudes towards 'protected sex' in Nkwanta; 3) to test the significance of female seasonal migration patterns and socio-economic characteristics for HIV risk perception in a rural district of Ghana; and 4) to determine if CHPS increases condom use among women aged 15-49 who have a self-reported perception of HIV risk.

Juju love and a woman's cough: traditional perceptions of sexual behavior and HIV risk

Given the diverse ethno-linguistic population in Nkwanta, there are various local translations and terminologies for HIV. By far, the most common expression is 'a woman's cough'. This phrase is not only a gender-based metaphor that places the burden and blame onto women as vectors or carriers of the illness, but is also a phrase applied to more than one infectious disease, including tuberculosis. Further investigation revealed that 'a woman's cough' directly refers to how the disease is thought to be transmitted through sexual intercourse. This intriguing phenomenon led to a district wide stake holder's meeting that has since become the Partnership for Rural HIV/AIDS Communication. The purpose of the meeting was to discuss the heritage and history of how local tribes have interpreted new bio-medical epistemologies with stories of local folklore, magic and superstitions.

Meeting participants from across the district that represented various backgrounds, traditional beliefs, religions and tribes discussed personal and community-held beliefs, attitudes

and practices specific to rural traditions and cultures. The main traditions that were identified as contributing factors to a vulnerable environment for HIV in villages included forced and early marriages, female circumcision, enslaved *trokosi* wives given to fetish priests, tribal and ritualistic scarification, tattoos, widow inheritance, polygamy and adultery. The increasing exposure to western public expressions of sexuality and the decay of safe traditional practices were also mentioned as putting rural communities at increasing risk. When asked why a faithful polygamous marriage is more at risk than a monogamous marriage, one stakeholder explained that oftentimes it is adultery and not polygamy per se that can make the difference. He quickly responded without hesitation, *"maybe you will be going in for many, many women, maybe you have 3-4 girlfriend, two get pregnant and before you know it -- you will be adding wives to the household like flies in the kitchen."*

More than one cleansing ritual was mentioned as examples of unsafe practices that could be revised instead of abolished to decrease the risk of transmission. One such ritual *'to remove the devil'* is performed after any mishap, death, sickness or calamity by shaving the heads of wives, relatives and especially children all at once, one after the other using the same knife. Another cleansing ritual requires a man to have unprotected sex with a woman who is menstruating *'to fortify against all evil and curses.'* Likewise, widows who have lost their husband for any reason were told they would only be cleansed if they had sexual relations with a man *'outside of the community or district before coming back inside for [their] next husband.'* School children also like to perform 'blood covenants' as oaths of friendship where they will cut their skin, mix the blood of their friends onto their own wounds and then drink the mixed blood to form a lasting bond of friendship or love.

There were several vivid discussions on how infectious diseases including HIV are believed to be transmitted. One of the traditional leaders informed the group of the belief behind the term 'a woman's cough' is that when a woman coughs during orgasm she will transmit AIDS to her partner. *"If in the act the woman coughs the man will get it. Or when you come to discharge and you cough the woman will get it and then the person will cough 'anngh' until he dies. And if you don't see the elders performing rites that's it then you'll be coughing, growing lean and then you <u>die</u>. It's different than tuberculosis-o! This is AIDS I'm talking about."* Although this statement implies that both genders can transmit HIV by coughing during intercourse, 'a woman's cough' has become the universal lexicon for AIDS in Nkwanta. 'A woman's cough' in other communities used to be known as tuberculosis and was only recently used in reference to AIDS, whereas other communities still refer to TB as 'a woman's cough' and only refer to AIDS as 'go lean and die.'

As a rejoinder, another respondent remarked that men can also get the 'go lean and die' disease if his sexual partner refuses to sleep by the wall. *"At our place the woman will always be sleeping by the wall. Because if the woman becomes pregnant and is on the edge and you will always be jumping over the pregnant woman the man will get lean, sick and die. That's why at our place the women have been sleeping by the wall side."*

Juju spirituality can be used both as a catalyst for the spread of HIV and as protection against disease. A particular phenomenon referred to as *'juju love'* promotes promiscuity and was identified as a root cause to the spread of HIV, as described in the following conversation:

> *R1: "We have something called 'Kunya' a juju love that promotes promiscuity. You can woo any woman. The woman will be following you like dogs. If there is a big river she will cross it to see you even if you are ugly. It will put her at a high level of sexual desire. She'll have to have you. She won't sleep until she is with you."*
> *R2: "We have different types some for man and woman."*
> *R3: "Yes…the juju love that the woman will put under her eye here, and as soon as the man looks into her eyes he will have to go in for her."*

This quote is very telling in its vivid depiction of how black magic can in a way remove the responsibilities of individual sexual decision making. After all, love is pre-determined by magic and can be a spontaneous event that is unpredictable, unplanned. Consequently, both partners, those who are succumbed by black magic and the object of their affection do not have control over the 'act of love'.

Although juju love or traditional spirituality were identified as instigators of potentially unsafe and spontaneous sexual practices, it was also noted that juju can prevent the transmission of HIV during or before sex. For example, sacrificial rituals can cure or prevent AIDS, specifically, "*someone may be sick because the Gods have become angry so you have to pacify the Gods."* Another discussion described the capability of temporarily removing the sickness before having sexual intercourse, which may be considered an example of a traditional method of 'protected sex':

> *R1:"When you go to juju woman they can conjure concoction, cut-them, or wear talisman, and then they are immunized. The man wearing the talisman can even remove (**makes a grabbing motion with his fist**) the sickness from the woman put it on the wall and when you are finished with the affair you can put it back on the woman."*

R2: "But why, if you can remove it, remove the illness why do you want to put it back on the woman why can't you leave it on the wall?"
R1: "Because that is her disease that is her fate. You can't remove it. God put it there. If you remove it he will get angry."
*R2: "Oh, okay." (**laughs**)*

Participants, both older and younger were adamant that rural traditional, illiterate women who have not gone to school are at less risk for transmission than educated women, some of whom were known to engage in petty commercial sex work for extra pocket money. Adolescents had more difficulty in placing a risk assessment but concluded that it might depend on the community the child was from—if she was ever 'meant to go to school' or if she had dropped-out of school.

Data and methods

This analysis is based on a 2004 random cluster sample survey known as the Nkwanta District CHPS Evaluation Survey (NDES). In March 2004, 16 field interviewers, four supervisors and four translators were trained to carry out interviews in 895 households where there were 1,159 resident female respondents of reproductive age (15-49 years). Sample households were dispersed in 60 Enumeration Areas (EAs) or clusters. Measurements of basic well-being and health indicators include literacy, household wealth, migration, morbidity, fertility, neonatal and child mortality, health service utilization, immunization coverage, family planning knowledge and use, as well as HIV/AIDS knowledge, condom use and risk perception. The objective of this survey was to evaluate the effectiveness of the CHPS service delivery strategy in changing health behavior and outcomes.

Data limitations

The Nkwanta District Evaluation Survey (NDES 2004) has several limitations for this analysis. The Nkwanta District Health Directorate established CHPS in communities that were classified as 'deprived but ready'. Indicators that were used to establish deprived areas included distance to an established health centre, socio-economic characteristics, cultural isolation and health indicators, such as high fertility and child mortality.

Locations for the Community Health Compounds were also chosen for their accessibility to public roads, due to the necessary logistics of building a health compound and transporting equipment and supplies from the district hospital and administrative offices. Communities were deemed ready for CHPS once they were also able to mobilize a Volunteer Health Committee and communal labour for assisting in the construction of the Community Health Compound. Villages that did not have clear leadership, that were experiencing tribal conflicts or lacked essential

infrastructure were not able to accommodate a Community Health Officer in the locality. In conclusion, the process of selecting communities for programme participation presents several problems of endogeneity for the present analysis: 1) different levels of programme exposure, both in terms of time and geographical proximity, 2) variance in initial poverty and health indicators, as well as local administrative capacity, and 3) community willingness to embark on the programme.

Results

CHPS coverage. Since 1998, Nkwanta has had eight CHPS implementation zones in operation. Thirty-nine percent of female respondents have a CHPS Community Health Compound as their nearest health facility and 27 percent of the sample population lived in a community demarcated as being in a CHPS zone.

CHPS has reduced the geographical distance to the nearest facility for 21 out of the 60 sampled clusters. On average, these 21 clusters were 22.37 km away from their nearest health facility before CHPS was implemented in their communities. After CHPS was implemented, these communities were on average a distance of 8.99 km from the nearest CHPS Community Health Compound. This represents an average decrease of over 13 km for 35 percent of the sampled clusters.

Ethnicity, religion, migration and education. The 2004 Nkwanta District Evaluation Survey has identified 26 distinct ethnic groups among the female sample population. Ethnic diversity has been due to historic, as well as recent migratory and settlement patterns. The Konkomba ethno-linguistic group represents a majority 48 percent of the sample population, despite the fact that they are not indigenous to the district. Most of the Konkomba migration from the northern regions occurred as a result of 1994-96 ethnic conflict in the neighbouring Northern Region leading to 2,000 deaths and the displacement of 200,000 villagers residing in 440 decimated villages.[i]

Sixty percent of the Konkomba tribe mentioned traditionalism as their main form of worship. The next most traditional ethnic group was the indigenous tribe, Achude, with 26 percent reporting a traditionalist identity. Although Christianity was the predominant main religion reported by the total sample, it is important to note that there are several traditional beliefs and practices, which are pervasive across all religious affiliations.

A considerable proportion of female respondents reported having lived in their community for less than five years (16.3 percent); and almost 6 percent of female respondents have lived in their present community for less than two years. There is no significant difference

between the migration status of women currently living in CHPS zones and those living in non-CHPS clusters. Approximately 20 percent of both CHPS and non-CHPS respondents either temporarily or seasonally migrate outside of their community for work. All of the respondents are presumed to live in a rural area, although this analysis does not distinguish between current residence in a rural town or village. In addition, labor migration in the past year is defined as travel outside of residing community for at least one night for the purposes of work or gainful income earnings. Separate questions were asked regarding number of communities traveled to, names of communities including country if international and primary season that the respondent primarily travels in for seasonal labor migration.

Over 70 percent of the sample population has never completed primary school. Female respondents living in clusters covered by CHPS are more likely to have never completed primary school than females in non-CHPS sample clusters. Eighty percent were illiterate, 14 percent could read with difficulty, and only 6 percent stated that they were literate with ease. The Konkomba tribe had the highest illiteracy and lowest educational attainment rates among the sample. Ninety percent of Konkomba women had never completed a primary education and only 5 percent were literate in comparison to 34 percent of other ethnicities.

HIV Knowledge. (see table 1) The survey has two measures for HIV knowledge, an 11 question index for correct transmission knowledge and a 7 question index for accurate prevention. Both measures range from 0 for no correct knowledge and 1 for completely accurate information. Women living in CHPS zones had an insignificantly higher level of knowledge for transmission than women who did not live in a CHPS zones (.48 and .45, respectively). Overall, respondents had a higher average score for prevention information (.52) with CHPS residents having a .066 point improvement over non CHPS women, significant at a 99% confidence interval. Condom use was the second lowest prevention mechanism correctly identified by all respondents (45% non-CHPS and 57% by CHPS). The combined score for HIV knowledge was .52 for CHPS respondents .47 for non-CHPS and a .48 for the total population.

Self-reported HIV risk. (see table 2) Respondents were asked if they were at risk for HIV, and then if they believed they were at risk of HIV from their partner. Approximately an equal proportion responded yes, no or didn't know, with a slightly larger percentage responding yes they were at risk for HIV (36%) or that they were at risk of HIV from their partner (38%). Twenty-three percent of women who said they were not at risk for HIV subsequently stated that they were at risk from their partner. (see table 3) This might be attributable to a perception that self-risk is associated with their own sexual behavior and not necessarily the promiscuity of their regular partner. Fifteen percent of respondents who said they were at risk did not believe they

were at risk from their partner. This may be due to either multiple sexual partners besides their main partner and spouse, or from alternative non-sexual mechanisms of transmission, including traditional or inaccurate beliefs. Respondents may also be responding to the popular communication message, "we are all at risk".

Determinants of self-reported HIV risk. (see table 4) Since an initial constrained Bernoulli regression failed to converge, this analysis used results from a Poisson quasi-likelihood model.(See Carter, et al, 2005) This was done in order to maintain assumptions of a multi-level fixed-effect variance based on the community cluster. These models produce output in terms of incidence risk ratios, which are synonymous with risk ratios in this particular case. Model C specifically looks at variables that are proximate determinants of geographical mobility and access, such as regular public transportation availability and distance to the nearest district health facility, all of which are in sub-district capitols with major market trading centers and transportation hubs. Any perception of risk either from self or from the respondent's partner was defined as a binomial dependent variable. Those who responded did not know were treated as no risk.

In the unadjusted univariate models (see table 4, column 1), socio-economic determinants that were significantly associated with increased HIV risk were age groups 20 and above, literacy attainment (with or without difficulty), parity of one or above, female head of household (may be self), household wealth, and migration for work. The variables with a decreased likelihood of risk assessment were traditional worship, residence in a polygamous household, and 15+ KM from the sub-district capitol. When controlling for all individual level characteristics, except for migration, everything but the age groups remained significant, with only slight changes in associated strength of effect. The wealth index and polygamy determinants remain significant after adjusting for the group of household characteristics. The only two access and mobility variables that are associated with HIV risk are labor migration (1.22) and 15+ KM distance to the sub-district capitol (.78). In the combined mixed model, traditional worship (.81), literacy attainment (1.36), a wealth index in the middle 40% (1.30) and the highest 20% (1.40), and finally labor migration (1.17) are all significantly associated with a perceived risk of HIV infection.

Seasonal labor migration and prior residence. In order to better distinguish between the various dimensions of migration, Model C.1 and C.2 (see table 5), test for an association between seasonal migration and prior residence for women who migrated to the community in the past two years. Women who migrate for work specifically during the harvest season have over a 40 percent increased likelihood of perceiving themselves as being at risk for HIV relative to labor

migrants who do not travel in any particular season. Labor migration in the rainy and dry or Harmattan seasons had a reduced but insignificant rate ratio. For women who migrated to their present community in the past two years from a rural village had a 32 percent decreased relative self-perceived risk of HIV in comparison to women who had migrated from an urban city.

Risk perception and condom use. (see table 6) Due to low condom use rates, condom use is defined as always or occasional use relative to never used. This analysis excluded women who did not perceive themselves to be at risk and only analyzed determinants found to be significant in the Combined Model for risk perception. The primary objective of this model was to ascertain a program level impact of CHPS on condom use for women who perceived themselves to be at risk for HIV. Significant associations in this model include a female head of household (RR=4.10), literacy attainment (RR=2.24), the least poor in the top household wealth quintile (RR=1.83) and CHPS (RR=2.12).

Discussion

Research result findings conclude that in Nkwanta district although women with a higher socio-economic status have an increased perception of HIV risk, they also have greater access and means of prevention through condom use. Controlling for several significant socio-economic characteristics, CHPS has been found to increase the incidence rate ratio of condom use among women who perceive themselves to be at risk, either directly through their own behavior or through that of their main partner.

While previous models have indicated that migrants in general are 'risk takers', this study examines the issue further, revealing greater complexities related to seasonal migration. Women who migrate during the harvest season are more likely to report self-perceived risk than women who migrate during other seasons, as well as women who travel indiscriminately without regard to a particular season. This study did not provide details on the nature of seasonal migration, if it was due to farming, fishing or trading activities. However, it may imply that there area socio-political and economic relationships between the seasonality of migration and not migration per se. Qualitative research by Anarfi, et al in urban markets in Ghana suggested that the sexual coercion of female itinerant traders by male farmers, truck drivers, and other men dependent upon for purchasing goods, transportation and accommodation was pervasive and generally summarized as the unfortunate 'nature of the business'. Although this mechanism of self-perceived risk can not be concluded from this study, it may explain increased risk for women whose migration patterns coincide with the harvest season.

Other studies in Southern and Eastern sub-Saharan Africa have often stressed the relationship between commercial sex workers and truck drivers. (Brokerhoff and Biddlecombe) The increase of sexual networks among willing partners who are inherent risk takers as predetermined by their willingness to migrate has also been mentioned as a main cause for increase seroprevalence in urban migrant communities. However, this study brings to attention that the seasonal patterns of labor migration can be a strong determinant for increased perceived risk. This result proves that it isn't the movement itself that puts people at greater risk, but may be the 'conditions and structure of the migration process'. (Decosas and Adrien 1997 as cited in Lurie2006) Greater anthropological and demographic research on the economics of migration patterns, sexuality and relationship networks would provide a more in-depth investigation of this subject to better inform key policy decision-makers and health programmes in the field, such as CHPS that could target female itinerant traders. Such future research may also contribute an alternative perspective to the growing field of food security and HIV in rural Africa.

Bibliography

Anarfi, J. K. 1993. Sexuality, migration and AIDS in Ghana: a socio-behavioural study. Pp. 45-68 in Sexual Networking and HIV/AIDS in West Africa, ed. J.C. Caldwell, G. Santow, I.O. Orubuloye, P.

Author. Fieldnotes. Nkwanta Mellon Fellowship, 2003-2004.

Bloom, S.S., et al. Community effect on the risk of HIV infection in rural Tanzania, Sex Transm Infect 2002: 78: 261-266

Brokerhoff, M and Biddlecom, A., Migration, Sexual behavior an dHIV diffusion in Kenya, Policy Reaserch Division Working Papers, Population Council, No. 111, 1998.

Caldwell and J.K. Anarfi. Supplement to *Health Transition Review* 3. Canberra: Australian National University.

Caldwell, J. C. 1969. *African Rural-Urban Migration: The Movement to Ghana's Towns*. Canberra:Australian National University Press.

Coast, Ernestina. 'Sexual behaviour and perceptions of risk: male rural-urban migrants in Tanzania.' Paper presented at International Union for the Scientific Study of Population XXV International Population Conference, Tours, France, July 18-23 2005.

Cohen, D., Socio-economic causes and consequences of the HIV epidemic in Southern Africa: A case study of Namibia, UNDP, HIV and Development Programme, Issues Paper No. 31(undated).

Dennis, C. and Peprah, E. "Coping with Transition through Organisation: Techiman Market, Ghana." *Gender & Development* **3** (No. 3) 1995: 43-48

Dugbaza, T. "Women and Integration in Rural Development." *Ghana Journal of Sociology* **82** (No. 14) 1981: 73-94

Ghana Health Service. Nkwanta Health Development Centre. Nkwanta District Evaluation Survey of CHPS, 2004.

John K. Anarfi, Ernest N. Appiah and Kofi Awusabo-Asareb, Livelihood and the risk of HIV/AIDS infection in Ghana: the case of female itinerant traders, *Health Transition Review, Supplement to Volume 7, 1997, 225-242*

Lagarde, E. , et al. Mobility and HIV spread in to rural areas of West Africa, Prepared for IUSSP general conference 2001. Brazil.

Lurie, Mark, The epidemiology of migration and HIV/AIDS in South Africa, Journal of Ethnic and Migration Studies, Vol 32, No. 4, May 2006 Pp. 649-666.

Maharaj, Pranitha and Cleland, John, Risk perception and condom use among married or cohabiting couples in KwaZulu-Natal, South Africa, International Family Planning Perspectives, Vol 31, No 1, March 2005.

Najjumba M I, et al., Risk perception and condom use in Uganda, African population Studies, Vo 18, No. 1 2003, pp. 67-80.

Table 1. HIV Knowledge Scores (% of correct responses), by CHPS exposure

Transmission	Non-CHPS	CHPS	Total
Kissing/coughing	10%	12%	11%
mosquito	14%	19%	15%
Spirits/black magic	26%	25%	26%
Food	29%	32%	30%
Cup	31%	29%	30%
Latrine	30%	33%	30%
Bed	35%	40%	36%
Pregnancy	74%	80%	75%
Breastfeed	79%	83%	80%
Needles/Blades	81%	84%	81%
Sex	82%	88%	83%
Mean score (0-1)	**0.45**	**0.48**	**0.45**

Prevention

Norplant	44%	51%	45%
Condoms	45%	57%	47%
Injections	50%	57%	51%
Pills	50%	59%	52%
Visual assessment of partner	54%	55%	54%
Traditional medicine	55%	59%	55%
Abstinence	63%	69%	65%
Mean Score (0-1) ***	**0.51**	**0.58**	**0.53**

Overall Mean Score (0-1)	**0.47**	**0.52**	**0.48**

Note: Correct responses were coded as "1" and "0" for incorrect answers. This table, therefore, reflects percentage of correct responses.

*** Significant difference in mean scores at the 99 percent confidence interval between CHPS and non-CHPS subgroups.

Table 2: Distribution of self-perceptions of risk, females (15-49)

	Self-risk		Risk from partner	
	n	*%*	*n*	*%*
Don't Know	349	30.24	374	32.61
No	395	34.23	342	29.82
Yes	410	35.53	430	37.49
Total	**1154**		**1146**	

Table 3: Cross tabulation of self-perceptions of risk and risk from partner, females (15-49)

		Risk from partner			
		Don't Know	*No*	*Yes*	*Total*
Self-risk assessment					
	Don't Know	265	47	33	346
	No	70	234	89	393
	Yes	39	61	308	408
	Total	**374**	**342**	**430**	**1,146**

Table 4. Determinants of HIV risk perception (females aged 15-49), NDES 2004

	Univariate Models *RR*	Model A *RR*	Model B *RR*	Model C *RR*	Combined Model *RR*
Age Group					
15-19	1.00	1.00			1.00
20-24	**1.45***	1.25			1.24
25-39	**1.53****	1.29			1.30
40+	**1.35***	1.24			1.19
Traditional worship					
No	1.00	1.00			1.00
Yes	**0.68*****	**0.73*****			**0.81****
Literacy attainment					
No	1.00	1.00			1.00
Yes	**1.55*****	**1.47*****			**1.36******
Parity(union formation)					
0	1.00	1.00			1.00
1+	**1.44*****	**1.40***			1.33
Income					
No	1.00	1.00			1.00
Yes	1.04	0.95			0.95
Head of household					
Male	1.00		1.00		1.00
Female	**1.38****		1.22		1.16
Polygamous household					
No	1.00		1.00		1.00
Yes	**.79****		**0.78****		0.87
Household wealth					
Poorest 40%	1.00		1.00		1.00
Middle 40%	**1.32*****		**1.37******		**1.30*****
Least Poor 20%	**1.68*****		**1.67******		**1.40******
Labor migration					
No	1.00			1.00	1.00
Yes	**1.20***			**1.22****	**1.17***
Migration in past 2years					
No	1.00			1.00	1.00
Yes	0.73			0.73	0.76
Public transport access					
No	1.00			1.00	1.00
Yes	1.11			1.01	0.94
Health facility access					
0-5 KM	1.00			1.00	1.00
5-10 KM	1.01			1.01	1.04
10-15 KM	0.94			0.96	1.01
15+ KM	**0.79****			**0.78***	0.95
Program exposure					
Non-CHPS	1.00			1.00	1.00
CHPS	1.11			1.10	1.06

Table 5. HIV risk perception by migration status

	Model C.1	**Model C.2**
	RR	**RR**
Seasonal labor migration		
Non-seasonal labor migration	1.00	
Rainy season	0.34	
Dry/Harmattan season	0.46	
Harvest season	**1.41****	
Prior residence (migration in past 2 yrs)		
City		1.00
Town		0.84
Village		**0.68***

Table 6. Risk perception and condom use: What does this mean for CHPS?

	CONDOM USE GIVEN RISK
CONDOM	**IRR**
Program Exposure	
No CHPS	1.00
CHPS	**2.12***
Age Group	
15-24	1.00
25-34	0.84
35-44	0.51
45+	0.19
Ethnicity	
Other	1.00
Ewe	1.19
Konkomba	0.88
Traditional	
No	1.00
Yes	0.79
Parity	
0	1.00
1+	1.05
Household wealth	
Poorest 80%	1.00
Least Poor 20%	**1.83***
Literacy	
Illiterate	1.00
Literate	**2.24***
Head of household	
Male	1.00
Female	**4.10****
Labor migration	
No	1.00
Yes	1.52

i Author's 2004 field notes and interviews. And "Exclusion, Association and Violence: Trends and Triggers in Northern Ghana's Konkomba-Dagomba Wars", The African Anthropologist Vol.10(1) 2003: 39-82.