Social, Economic and Demographic Determinants of Sexual Risk Behaviors among Men in Rural Malawi: A District-Level Study

Valerie A. Paz Soldan[1], Joseph E. deGraft-Johnson[2], Thomas Bisika[3], Amy O. Tsui[4]

ABSTRACT

Data from a survey of 715 men aged 20-44 from Mangochi district of Malawi were used to assess the sociodemographic and economic determinants of (1) having ever paid for sex, (2) total number of sex partners in the past year, and (3) having ever used condoms. Different individual characteristics were associated with each of these sexual behaviors. Polygamy and being a fisherman who has left home for over a month in the past year for work reasons were both positively associated with having ever paid for sex, whereas those with more household wealth were less likely to have paid for sex. The influence of education, age, age at sexual initiation, Muslim religion, polygamy, occupation, and having ever paid for sex on total number of sexual partners in the past year are all evident. Finally, secondary education, work-related migration, and having ever paid for sex were significantly associated with having used condoms. (*Afr J Reprod Health* 2007; 11[2]:33-46).

RÉSUMÉ

Les déterminants sociaux, économiques et démographiques des comportements à risque chez les homes au Malawi rural: Une étude au niveau du district A l'aide des données recueillies d'une enquête de 715 hommes âgés de 20-44 ans du district de Mangochi au Malawi, nous avons évalué les déterminants socio-démographiques et économiques 1) d'avoir jamais payé pour les rapports sexuel 2) du nombre de partenaires sexuel au cours de l'année passée et 3) d'avoir jamais utilisé les préservatifs. De différentes caractéristiques individuelles ont été liées à chacun de ces comportements sexuels. La polygamie et le fait d'être un pêcheur qui a quitté le foyer conjugal pour plus d'un mois au cours de l'année passée à cause du travail étaient, tous les deux, liés au fait d'avoir jamais payé pour les rapports sexuels, alors que ceux qui possédaient de la richesse familiale avaient moins la possibilité de payer pour les rapports sexuels. L'influence de l'éducation, de l'âge, de l'âge au moment de l'initiation sexuelle, la religion islamique, la polygamie, le métier et d'avoir jamais payé pour un rapport sexuel, le nombre total des partenaires sexuels au cours de l'année passée, est toute évidente. Enfin, l'éducation secondaire, la migration liée au travail et le fait d'avoir jamais payer pour un rapport sexuel ont été significativement liés au fait d'avoir jamais utilisé les préservatif. (*Rev Afr Santé Reprod* 2007; 11[2]:33-46).

KEY WORDS: *sexual risk behaviors, condom use, occupation, mobility, determinants, sub-Saharan Africa*

[1]*International Health and Development Department, Tulane University School of Public Health and Tropical Medicine, New Orleans, LA*
[2]*Save the Children Federation-USA, Washington, DC.*
[3]*Centre for Social Research, Zomba, Malawi.*
[4]*Population and Family Health Sciences Department, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.*

Corresponding Author: *Valerie Paz Soldan, 1440 Canal Street, Suite 2200, New Orleans, LA 70112 Telf: (504) 988-8803 Email: vpazsold@tulane.edu*

Introduction

It is estimated that 14% of adults in Malawi are infected with HIV[1]. In urban areas, the prevalence was estimated at 70% among sex workers in the capital city of Lilongwe in 1994 and at 54.8% among patients at facilities for treatment of sexually transmitted infections (STI) in 1996[1]. The already low life expectancy at birth in Malawi has declined from 46.7 to 42.2 among men and 50 to 41.1 among women between 1990 and 2005[2]. In 2003, 84,000 people were estimated to have died from AIDS in Malawi, out of a total population of 12.3 million[1]. In addition to the impact of this epidemic on people's lives, their families, and communities, HIV/AIDS is leading to many socioeconomic problems, such as a dramatic increase in the number of orphans and decreased economic capacity in the country.

A high number of recent sexual partners is associated with increased risk for HIV, especially in countries where the prevalence of condom use is low. In Malawi, only 11.4% of men report currently using condoms[3]. Given the high HIV prevalence and low condom use, sex with a casual partner or sex worker is especially risky in this setting. Due to the magnitude of the socio-economic consequences of the AIDS epidemic in Malawi, it is critical to assess the determinants of high risk sexual behaviors, as well as protective behaviors, among men, which in turn can improve the effectiveness of public health interventions. Sexual behaviors among men to be examined in this article include: 1) having ever paid for sex, 2) total number of sex partners in the past year, and 3) having ever used condoms.

Social, demographic and economic determinants of risky and protective sexual behaviors

Many studies in the past decade have examined the association between various individual and community level factors and HIV infection and prevalence in various sub-Saharan African settings[4-8]. Underlying these studies is the association between sociodemographic and economic factors, such as age, age at first intercourse, religion, occupation, mobility, education, and socio-economic status, and various risky or protective sexual behaviors. For example, in rural Tanzania, a lower age at first intercourse has been associated with a larger mean number of sexual partners[9]. Also, younger men are more likely to have more lifetime sex partners than older men[9]. Age may also be associated with protective behaviors, such as condom use. Adetunji (2000) found that increasing age was associated with increased condom use among single men in Zimbabwe[10].

Religiosity and religion may be influential on a man's decision to engage in premarital or extramarital sex, or to have more than one wife. In one study in Senegal, men who considered religion to be important to them were found to have a lower perception of risk for contracting HIV[6]. It is unclear whether this lower risk perception was related to a lower number of risk taking behaviors or if they felt "protected" by their faith. However, in the same study, women who considered their religion to be important to them had a statistically significant higher perception of risk than other women[6]. The effect of religion on sexual partnerships may vary depending on the religion and the level of religiosity of the individual, as well as the various religions represented and religiosity observed at a community level, which varies significantly within regions, countries, and communities.

Education can also play a role in determining the number of sexual partners among men, though the direction of the effect might vary. A review of the literature on the association between education and HIV infection by Hargreaves and Glynn (2002) revealed that in developing settings, higher education was often associated with a greater risk for HIV infection, likely due to the higher status associated with higher education[11]. In Malawi, Chirwa (1997) found this to be true: higher education was associated with an increased number of sexual partners among men in Malawi[12]. However, there have also been studies in other

regions of Africa showing a different effect of education: a study in Kenya revealed that there was a higher level of sexual activity among non-students than among students[13]. There is also evidence that higher education may result in a later age at first sex, which would potentially result in fewer lifetime sexual partners. Education has also been associated with increased condom use in several studies[10, 14].

The effect of occupation, including the mobility associated with various occupations, on sexual behaviors has also been examined in different regions of Africa, mostly with regards to truck drivers and mineworkers[7, 12, 15-18]. As is the case with many young men in south-eastern Africa, young men in Malawi commonly leave their villages before getting married to earn money in larger cities[12]. While away, these men usually live in quarters near brothels and bars, and often engage in casual sex with local women or sex workers[12, 18]. Upon return to their villages, men are often sought out by local women due to their increased social status and their income earned while away. Other factors directly related to migration for work may contribute to men engaging in sex with a higher number of women and paying for sex, such as whether men migrate to urban or rural areas, and whether they regularly migrate to the same location (potentially developing regular partnerships in the migration location versus paying for sex)[12, 16, 18]. Brockerhoff and Biddlecom (1999) found that men in Kenya who travel to urban areas have almost twice the number of casual sex partners compared to men who travel to rural settings, regardless of their marital status[19].

Several previous studies have focused on highly mobile occupations, such as mineworkers or truck drivers or sex workers, due to their identification as high risk groups for becoming infected with and transmitting HIV and other STIs to the general population[7, 15]. Many studies and interventions have focused specifically on these high risk groups. However, the economic situation in Malawi drives people of many different occupations to migrate for short and extended periods of time for work reasons, and the effect may be the same regarding increased sexual partnerships and paid sex among occupations which are not traditionally considered highly mobile.

In this particular rural district of Malawi, the main occupations of men were related to farming, fishing, and business (including trade). This study examines the social, demographic and economic (occupation and mobility) determinants of risky and protective sexual behaviors among these rural men. After adjusting for these social, demographic and economic variables, we also analyze the association between these sexual behaviors and the interaction between mobility and various occupations in the second model for each outcome. Also, a variable for "ever paying for sex" is added to the second model for 1) number of sexual partners in the last year, and 2) ever use of condoms.

Hypotheses

This study addresses the following questions. Among men in a rural district of Malawi, what are the sociodemographic and economic determinants of 1) having ever paid for sex, 2) the number of sexual partners in the past year, and 3) having ever used condoms? The main hypotheses to be tested are:

Men with occupations of higher status, such as businessmen, are more likely to have had more sexual partners in the past year, more likely to have ever paid for sex, but also more likely to have ever used condoms, than men with no paid occupation.

· Men absent from their village for at least one month in the past year for work are likely to have more sexual partners in the past year, more likely to have ever paid for sex, and more likely to have used condoms than men who did not leave their villages for work.

METHODOLOGY

Study Setting

This study took place in the Mangochi district in south-eastern Malawi. Mangochi is a predominantly rural (94% rural) district with some of the lowest education and health indicators of the country, and considered one of the poorest districts in Malawi[20-21]. It also has a fairly homogenous population with regards to ethnicity, religion and wealth[20]. Most people of Mangochi district are from the Yao ethnic group, belong to the Muslim faith, and speak Chichewa and/or Chiyao[20]. Polygamy is a common practice in this region: among married men in our sample, over 20% reported having more than one wife.

This study took place in three Traditional Authorities (TAs) in the eastern lakeshore area: one of the TAs was along the eastern side of the lake (where there are no tourist facilities), another in the highlands connecting towards Mozambique, and the third was along the southern tip of the lake and into the highlands. Most people living in the sampled region earned their living as subsistence farmers and fishermen[22].

Data

The data used in this study come from the 2000 Malawi Pregnancy and STI Risk Perception and Avoidance Study which we conducted between July 2000 and January 2001. The main objective of the study was to examine people's perception of risk to becoming pregnant or getting infected with an STI and exploring their actions and behaviors in trying to reduce this risk. Interviews were conducted by trained research assistants of the same gender as the respondent in the local languages of Chichewa and Chiyao once a week for six consecutive weeks and once three months later with a targeted sample size of 750 men ages 20 through 44, and 950 women ages 15 through 34. Three Traditional Authorities (TA) of this rural district were selected through probability proportional to size (PPS) procedures. Within each of these TA, four enumeration areas were selected for this prospective cohort study using PPS, from which 1400 households were randomly selected from household listings for the study. Selection into the study was based on whether any member of the randomly selected household met the age specifications and agreed to participate in the study. The questionnaire collected information about the participants' social, economic and demographic characteristics; their knowledge, attitudes and practices regarding family planning and sexually transmitted infections; and their sexual history, as well as their daily sexual activity. A total of 738 men were successfully interviewed by our male research assistants, out of the 814 men selected and contacted (90.6%). To establish rapport, each respondent was interviewed weekly by the same male research assistant who interviewed the respondent the first week. In addition, during the survey implementation, the research assistants lived in the same communities as their respondents. Out of the 738 men, 23 reported never having had sex, and these were excluded from the sample used in the analyses. Also, for the 18 men who did not remember their age at first sex, the mean age at first sex for men of their age group was used. Thus, the total sample was 715 men between the ages of 20 and 44.

Dependent Variables

The three dependent variables used in this analysis were: 1) ever paid for or exchanged gifts for sex (referred to as "paid for sex" from now on), 2) total number of sexual partners in the past year, and 3) reportedly having ever used condoms.

With regards to the first variable, ever paid for sex, though we do not have specific data about female sex workers (FSWs) living in this district, data from the Malawi DHS 2000 reveals that a larger percentage of men in the southern region of Malawi have paid for sex (29.8%) than men in the central (12.7%) or northern regions (9.3%)[3]. Also, though it is known from the literature that

sex work is common in urban settings, especially in locations where many young men may gather regularly (i.e., mines), transactional sex can occur anywhere, especially in locations with much poverty and where women's economic opportunities are limited, such as this district[12]. In fact, in this study, close to 35% of men reported having ever paid for sex.

Many of the study's questions regarding socioeconomic and demographic circumstances are based on the past year in the man's life, so examining number of sexual partners in the past year captures more contemporaneously the association between selected determinants and the dependent outcomes. Men are more likely to remember the number of sexual partners they had in one year compared to their entire lifetime.

Condom knowledge and availability in this district are widespread. Around the time of the study, there were three hospitals, 29 health centers, 2 health posts and 134 outreach clinics in the district (Malawi Government 1999). Though the health centers sometimes ran out of condoms, they all offered condoms at most times, and local shops also carried condoms. Though some of these shops or health centers might be a 45-60 minute walk distance for men sampled in the most remote villages, most men in these villages regularly visited locations where shops and health centers were available for reasons of business or to visit the weekly market, and most men also made regular visits to the district center, where the hospital was located, on the backs of trucks or by bicycle, or when near enough, by foot. Hence, it is not surprising that most men had heard of condoms (94.4%). Of those who had heard of condoms, with an exception of eight men, all knew where to get them (64% stating they would get them at either the government hospital or a health center, 22% would get them at a pharmacy or shop, and the remainder would get them from a private facility, a field worker, friend, or relative). Thus, lack of condom use is unlikely to be due specifically to lack of knowledge or availability of condoms in these communities.

Independent Variables

Based on previous research findings, eleven independent variables were included in the model as potential determinants of sexual risk behaviors: age, age at first sex, education, union status, polygamous status, religion, income, household assets (wealth indicator), occupation, work migration, and having ever paid for sex. Two of these variables were continuous: age and age at first sex (in years). Preliminary analyses using adjusted Wald tests revealed that adding functional forms of these two variables, such as age squared or interaction terms with these variables, did not increase the R^2 of the model or change the coefficients or significance of the variables, and thus, these were not included in the final model. Three categories were created for education: no education (reference group), at least some primary education, and at least some secondary/higher education. Union status (married versus being single, divorced or widowed), polygamous status (having more than one wife or not), religion (being Muslim or being of another religion of which Christianity was the most common), work migration (been absent from home due to work for at least one month in the past year or not) and having ever paid for sex were all coded as dichotomous variables – and the latter category in each is used as a reference (i.e., being single, divorced or widowed is the reference group for partner, not having more than one wife is the reference group for polygamy, not being Muslim is the reference group for religion, etc). For occupation, five categories were established: farmer, businessman, fisherman, other occupation, and no paid occupation. Most farmers and fishermen in this area were subsistence farmers or fishermen who consumed what they produced, or might barter for different products at the weekly market. The businessmen included vendors who sold merchandise in their local markets, as well as other cities and countries. Those in the "other occupation" category included: carpenters, tailors, teachers, herbalists,

field workers, brick layers, and other less common jobs. Those with no paid occupation, which included students as well as individuals who might be working but not paid for the work they do (such as young men helping with a family farm), were used as the reference group. Though the characteristics of those with no paid occupation varied quite a bit, they all shared the quality of not being paid to be doing what they were doing. In the case of income, this information was collected for each household from the household head, and four categories for income were created based on quartiles: the lowest quartile (0-24 percentile of income) was used as the reference group. It is important to point out that income for the household may not represent the income available to each individual interviewed; hence, income may not represent individual's expendable income. Thus, a wealth variable was created using a factor analysis of household characteristics (construction materials of the home, ownership of items such as radio) and included in the models. Finally, interaction terms were created between the various occupation categories and "absent 1+ month" to examine whether the suspected effect of men's occupation on sexual risk is enhanced by their mobility.

Analysis Methods

Descriptive information about the sample was obtained calculating the frequencies and means. Chi-squared and t-tests were conducted to examine the unadjusted association between the three outcomes of interest and the independent variables of interest related to occupation and migration. Finally, two models were estimated for each dependent outcome, the first one with all the social, demographic and economic (including occupation) independent variables just described, and the second also including occupation-mobility interaction terms. Logistic regression was used to model the first and third outcome (paid for sex, ever use of condoms), whereas ordinary least squares (OLS) regression

methods were applied to the second outcome, number of partners in last year.

STATA 8.0 software was used for the analysis. STATA survey commands were used to correct the standard errors estimated for models of the three dependent outcomes being examined, which adjust for sample clustering at the Traditional Authority level (strata) and at the Enumeration Area level (probability sampling unit). Potential multicollinearity among model predictors was assessed by correlating the parameters to one another, as well as by using the variance inflation factor (VIF). The correlations indicate that there does not seem to be a problem with multicollinearity in these models. The highest correlation among the explanatory variables was between having no occupation and having a partner (-0.54), followed by age and having a partner (0.49). This was consistent with the VIF results which were low.

Results

Sample Characteristics

The mean age of the men in our sample was 29 years (see Table I for sample characteristics). The mean age at first sex was 14.9. Most respondents were married or in union (70.2%), and 22.2% of those who were married had more than one wife (less than 10 of these men had more than 2 wives). Most men were Muslim (86.4%), and the rest were predominantly of Christian faiths. The education level and literacy was low: 29% of the respondents had no schooling, and almost half of all respondents (48%) reported being unable to read or read with difficulty. The main occupation of the respondents was farming (35%), though this varied by TA. Almost a quarter of the men had spent at least a month away from their village in the past year for work reasons.

Bivariate Analysis Results

Thirty five percent of the men in the sample reported at some point in their lives having paid

Table 1: **Descriptive Statistics of the Sample Characteristics (n=715)**

Characteristics	Percent/Average
Ever Paid for Sex (%)	
Yes	34.9
Sex Partners in Past year	
Mean number of sexual partners in last year	1.62
Mean number of new sexual partners in the last year	0.61
Ever Used Condoms	
Yes	32.7
Descriptive	
Mean age (years)	28.8
Mean age at first sex (years)	14.9
Union Status	
Married or in union	70.2
Single	29.8
More than one wife (of those married/in union, n=504)	22.2
Religion	
Muslim	86.4
Other (mostly Christian)	13.6
Education	
None	29.0
Primary	58.2
Secondary or higher	12.8
Occupation	
Farmer or farm worker	34.7
Business man	22.3
Fisherman	12.4
Other	13.0
None	17.7
Migration for Work	
Absent from home one or more months in past year for work	22.6

or given gifts to someone in exchange for sex. Without controlling for other variables, there were no statistically significant differences in having ever paid for sex by occupational groups, but men who had been gone for over a month in the past year for work reasons were significantly more likely to have ever paid for sex (see Table II). The mean number of reported sexual partners for the past year was 1.6. However, businessmen, men who had ever paid for sex, and men who had been gone for at least a month in the past year had a statistically significant higher number of sexual partners in the past year than men with no occupation, men who have not paid for sex, and men who had not been gone for over a month, respectively (unadjusted). Almost a third of the men reported having used condoms at some point in their lives. However, men in "other occupations", men who had been gone for at least a month in the past year, and men who had ever paid for sex were more likely to use condoms than men with no paid occupation, men who had not been absent from home for over a month in the past year, or men who had not paid for sex, respectively. Also, fishermen were less likely than men with no paid occupation to report having ever used condoms.

Table 2: **Selected differentials in proportions reporting ever paying for sex, number of sexual partners in last year and ever use of condoms (n=715)**

	Ever Paid for Sex	Number of Sexual Partners in Last Year	Ever Use of Condoms
Occupation			
Farmer	37.0	1.5	35.3
Fisherman	30.3	1.8	18.0**
Businessman	33.1	2.1**	30.0
Other occupation	36.6	1.7	52.7**
Ever Paid for Sex	—	2.1**	42.6**
Migration			
Gone at least 1 month in last year	46.9**	2.0**	41.4*

** p < 0.01, * p < 0.05

Multivariate Analysis Results

The logistic and OLS regression results for the three dependent outcomes are shown in Table III. Model One for each dependent outcome includes the social, demographic, economic, occupation and migration predictors. Model Two includes the same predictors as in Model One, but interaction terms for all occupational groups and work migration were added (using the interaction between no paid occupation and work migration as the reference group). In the bivariate analyses, work-related migration covaried strongly with the three outcomes. However, the various occupation variables were significantly associated with number of sexual partners in the last year and with condom use, but not with having ever paid for sex.

For the first dependent outcome, having ever paid for sex, the only significant predictors in Model One were being polygamous (polygamous men are more likely to have paid for sex, OR=2.079, p<0.05) and higher household wealth (as wealth increases men are less likely to have paid for sex, OR=0.828, p<0.05). When the occupation-mobility interaction terms were included in Model Two, the fit of the model improved slightly, and the association between polygamy and household wealth and having ever

paid for sex remained statistically significant. However, we also observe that fishermen who were absent from home for one or more months in the past year were almost four times as likely to have ever paid for sex (OR=3.99, p<.05) than men in any other occupations, regardless of whether they were absent from home or not, as well as fishermen who were not absent from home for over a month. This likely reflects the behavior of fishermen in the district to expend part of their fishing income on commercial sex upon return from an expedition or while away (since they may stay at villages along the lake shore during long fishing trips). Interestingly, although one third of men reported having paid or exchanged gifts for sex at some point in their lives, none of the other sociodemographic, economic, or occupational and mobility variables had statistically significant influences.

With regard to the determinants of the number of sexual partners in the past year, the predictors in Model One explain 13.9% of the variation in the dependent variable, whereas predictors in Model Two explain 15.7% of the variation. Though including the interaction terms slightly improves the fit of the model, the statistically significant determinants of number of sexual partners in the past year are the same between Models One and Two (and beta

Table 3: **Results from logistic and linear regressions examining the association between various sociodemographic and economic variables and having ever paid for sex, number of sexual partners in the last year, and reported condom use (n=715)**

	Ever Paid for Sex		No. of Sex Partners Last Year		Ever Use of Condoms	
	Model One	Model Two	Model One	Model Two	Model One	Model Two
Variables	OR (95% CI)	OR (95% CI)	b (se)	b (se)	OR (95% CI)	OR (95% CI)
Sociodemographic						
Age	0.969	0.970	-0.021*	-0.022*	0.996	0.996
	(0.936, 1.003)	(0.936, 1.005)	(-0.039, -0.002)	(-0.038, -0.005)	(0.964, 1.029)	(0.964, 1.029)
Age at first sex	1.009	1.008	-0.045**	-0.045**	1.025	1.023
	(0.969, 1.049)	(0.968, 1.051)	(-0.070, -0.020)	(-0.072, -0.019)	(0.985, 1.066)	(0.983, 1.065)
Muslim	1.141	1.162	0.471*	0.440*	1.088	1.079
	(0.680, 1.917)	(0.694, 1.945)	(0.071, 0.871)	(0.025, 0.855)	(0.585, 2.023)	(0.591, 1.968)
Partner	0.915	0.937	-0.353	-0.356	1.147	1.144
	(0.527, 1.591)	(0.537, 1.634)	(-0.751, 0.046)	(-0.735, 0.023)	(0.672, 1.959)	(0.671, 1.953)
Polygamous	2.079*	2.042*	1.312**	1.308**	0.799	0.802
	(1.156, 3.739)	(1.145, 3.641)	(0.792, 1.832)	(0.895, 1.721)	(0.443, 1.441)	(0.447, 1.439)
Primary education[a]	1.643	1.642	0.305*	0.286	1.304	1.304
	(0.895, 3.018)	(0.908, 2.969)	(0.011, 0.600)	(-0.031, 0.603)	(0.822, 2.070)	(0.820, 2.074)
Secondary educ.	1.821	1.808	0.196	0.166	4.449**	4.490**
	(0.602, 5.507)	(0.601, 5.438)	(-0.200, 0.593)	(-0.272, 0.604)	(2.116, 9.356)	(2.097, 9.612)
Income/Wealth						
25-49 quartile[b]	0.973	0.979	0.033	0.046	1.227	1.233
	(0.402, 2.356)	(0.424, 2.259)	(-0.605, 0.671)	(-0.563, 0.655)	(0.725, 2.077)	(0.738, 2.060)
50-74 quartile	0.893	0.891	-0.113	-0.115	1.187	1.19
	(0.359, 2.222)	(0.377, 2.110)	(-0.567, 0.341)	(-0.541, 0.312)	(0.726, 1.943)	(0.728, 1.946)
75-100 quartile	0.748	0.749	-0.065	-0.081	1.132	1.133
	(0.327, 1.708)	(0.352, 1.594)	(-0.488, 0.359)	(-0.507, 0.345)	(0.655, 1.958)	(0.657, 1.955)
Household assets	0.828*	0.829*	0.032	0.032	0.93	0.931
	(0.705, 0.973)	(0.702, 0.978)	(-0.059, 0.123)	(-0.064, 0.128)	(0.796, 1.086)	(0.803, 1.080)
Occupation and Migration						
Farmer[c]	1.347	1.215	0.465*	0.541*	1.691	1.792
	(0.647, 2.804)	(0.591, 2.496)	(0.021, 0.908)	(0.055, 1.028)	(0.681, 4.195)	(0.851, 3.771)
Fisherman	1.146	0.815	0.932**	1.107**	0.805	0.9
	(0.564, 2.328)	(0.364, 1.825)	(0.645, 1.218)	(0.548, 1.666)	(0.292, 2.225)	(0.294, 2.753)
Business man	1.189	0.973	1.109**	0.807**	1.305	1.506
	(0.706, 2.004)	(0.555, 1.705)	(0.398, 1.821)	(0.263, 1.351)	(0.624, 2.730)	(0.759, 2.987)
Other occupation	1.217	1.293	0.806**	0.815**	2.502*	2.892*
	(0.595, 2.489)	(0.642, 2.606)	(0.549, 1.063)	(0.502, 1.129)	(1.095, 5.719)	(1.300, 6.432)
Absent >1 month	1.731	1.130	0.203	0.103	1.54*	2.232
in past year	(0.792, 3.785)	(0.461, 2.771)	(-0.233, 0.640)	(-0.663, 0.868)	(1.005, 2.360)	(0.817, 6.097)
Ever paid for sex	—	—	0.613**	0.612**	1.732**	1.737**
			(0.273, 0.953)	(0.282, 0.942)	(1.231, 2.435)	(1.221, 2.471)
Farmer *	—	1.479	—	-0.273	—	0.76
Absent >1 month		(0.556, 3.934)		(-1.246, 0.701)		(0.212, 2.729)
Fisherman *	—	3.993*	—	-0.907	—	0.618
Absent >1 month		(1.050, 15.191)		(-2.122, 0.308)		(0.191, 2.005)
Business man *	—	2.101	—	1.285	—	0.56
Absent >1 month		(0.851, 5.188)		(-1.644, 4.214)		(0.144, 2.179)

Occup*	—	0.692	—	0.017	—	0.511
Absent >1 month		(0.216, 2.218)		(-0.815, 0.849)		(0.123, 2.125)
2 Log Likelihood /Constant	-438.05	-434.89	1.394**	1.485**	-415.69	-415.07
Pseudo R^2 /adj R^2	.0516	.0585	.1387	.1572	.0859	.0873
Chi^2 (DF)	47.71 (16)	54.02 (20)	—	—	78.12 (17)	79.36 (21)
Prob>chi² /Prob>F	.0001	.0001	0.0000	0.0000	0.0000	0.0000

** $p < 0.01$, * $p < 0.05$

Note: Standard error estimates were adjusted for sample clustering by using survey commands in STATA.

[a] Reference group for men with at least some primary and secondary education were men with no education.

[b] Reference group for income group quartiles are those men in the 0-24 quartile income group level.

[c] Reference group for farmer, fishermen, business men and men in other occupation were men without a current occupation.

[d] Reference group for fishermen who were absent for over a month in the past year are men in other occupations, regardless of whether they were absent or not, as well as fishermen who were not absent from home for over a month.

coefficients are similar): age, age at first sex, religion, marital status, polygamous status, primary education, occupation and ever paying for sex are all associated with the outcome. We observe that, holding other variables constant, higher current age and age at first sex are negatively associated with the number of sexual partners last year, such that being older or having a later age of sexual initiation, on average, reduces the number of partners in the past year. Being Muslim is clearly associated with a higher average number of sex partners in the past year. Adjusting for the other variables, married men had less sexual partners in the past year than single men. However, as might be expected, polygamy was associated with a higher number of sexual partners in the past year. Men with primary education had more sexual partners in the past year than men with no education, but no statistically significant association was observed for men with secondary education. Compared to men with no paid occupation, farmers (beta=0.541, p<0.05, estimates from Model Two), fishermen (beta=1.107, p<0.01), businessmen (beta=0.807, p<0.01), and men in other occupations (beta=0.815, p<0.01) had more sexual partners in the past year. Moreover, a positive association is also observed between paying for sex and number of sexual partners in the past year. However, unlike what was hypothesized, being absent from home in the past year for work was not statistically associated with

a higher number of sexual partners in the past year, nor were any of the interaction terms associated with occupation and mobility statistically significant.

For the third dependent outcome examined, reported ever use of condoms, both models have similar pseudo-R^2, and the three determinants of ever condom use are the same: secondary education, other occupation, and having ever paid for sex. Namely, men with secondary education were more than four times more likely to report ever using condoms than men with no education (OR=4.49, p<0.01, estimated in Model Two). Occupied men (who are not fishermen, farmers, nor businessmen) are almost three times more likely to report condom use than men without paid occupations (OR=2.89, p<0.05). Men who have paid for sex at any point in their lives are also more likely to report using condoms at some point in their lives than men who have never paid for sex (OR=1.74, p<0.01). However, we observe that in the first model, the association between being absent from home for one month or more in the past year for work reasons and ever using condoms is statistically significant (OR=1.54, p<0.05), but it is no longer statistically significant when the interaction terms are added in Model Two.

Discussion

For each of the three outcomes that were examined in this study, a different set of social, demographic

and economic variables were of statistical significance. Though we hypothesized that more wealth might be associated with having paid for sex, the opposite was true. One explanation for this, consistent with Chirwa's description of sexual dynamics in Malawi, may be that wealthier men may not need to pay for sex because they may be seen as more "desirable" partners and thus may be more likely to be able to have more girlfriends[12]. Though occupation variables and absence from home due to migration were not significant in the first model as separate variables, the interaction terms for certain occupations (fishermen, and to a less significant extent, businessmen) combined with absence from home were significant in predicting having ever paid for sex. In other words, the effects of being absent from home for work reasons on risky sexual behaviors are found to be significant when this variable is interacted with occupation, revealing that either the location where men migrate to or stay during their absence from home (both potentially associated with the type of work one does) seems to play a significant role in men's sexual behaviors while away or that the sexual risk taking behaviors of men while absent from home varies based on the status of their job or even whom they travel with (possibly determined by type of occupation). Specifically, the interaction term for fishermen who were absent from home for over a month in the past year and businessmen who were absent from home for over a month was statistically significant as a determinant for ever paying for sex. Though the interaction variable for businessmen who were absent for over a month in the past year was only slightly statistically significant (p<0.1), the estimated OR was large. Thus, mobility alone is not associated with having paid for sex, but mobility associated with a particular occupational group is, revealing a possible link between how and where different occupational groups move and transactional sex. Further research exploring the types of migration patterns of different occupational groups – where

people travel to, whether people travel as groups or alone, how long they are typically gone for – might help explain this finding. However, various reports from other regions of Africa have described the increased risk for HIV/AIDS among fishermen associated with their mobility, their access to cash income from the daily sale of fish, the availability of commercial sex work in the ports to which they arrive, and a certain sub-culture of "risk-taking" which exists in this occupational group[23].

It was hypothesized that men of occupations of higher status would have had more sexual partners in the past year than men of occupations that have less status, and this was observed. A positive association was observed between being a businessman, fisherman, farmer or man in other paid occupations compared to men in unpaid occupations. Though the sample in this study was fairly homogeneous, businessmen had higher status in these communities. When controlling for other factors (such as income and wealth), businessmen and fishermen did have a significantly higher total number of sexual partners in the past year compared to men without paid occupations. This association was not found for farmers or men in other occupations. However, mobility associated with the different occupations was not associated with number of sexual partners. It seems that those in occupations of higher status have more sexual partners, regardless of whether they leave their villages or not. Moreover, the interaction terms for occupation-mobility were not significant in predicting number of sexual partners in the past year, nor condom use. Instead, the influences of age, age at sexual initiation, religion, polygamy, primary education, having ever paid for sex, and type of occupation are evident as determinants of the number of sexual partners men had in the last year.

The main determinants for condom use in the models analyzed were secondary education compared to men with no education, having ever paid for sex relative to those who have not, and

having an "other" paid occupation compared to men with no paid occupation. Being absent from the village for over a month in the past year was not statistically significantly associated with any of the high risk sexual behavior outcomes, but was slightly significant for predicting use of condoms. This suggests that, when these men use condoms, they may be more likely to use them with less regular partners or partners they may not see as frequently (i.e., partners who are not from their village), which is consistent with the literature on this topic[10, 14].

Income level was not significantly associated with any of the outcomes examined, but this may be due to the homogeneity of the population that was studied or the lack of accurate information about income (most respondents were subsistence farmers or fishermen and had a difficult time approximating annual income). A wealth asset score was included in the models due to the possible lack of accuracy with the income levels, but wealth was only found to be significant in its association with having ever paid for sex. And, as mentioned previously, unlike what was hypothesized, those with less household wealth were more likely to have ever paid for sex. However, wealth was not associated with number of sexual partners in the past year, so wealthier men may not necessarily have more sexual partners than those who are less wealthy, but the type of sexual interaction is different: they don't have to pay for it.

There are several issues that warrant further discussion and examination. One issue that may affect the interpretation of the data about being gone for over a month in the past year is that men in some occupations may be gone for a day or a few days at a time on a continuous basis, but may have been less likely to report being gone from home for one or more months in the past year than men in occupations that had longer, but less frequent, absences from home. Second, the income and wealth variables used in the models were about the household income and wealth, rather than the individual's income or wealth. The individual's income or wealth may be more predictive of the individual's sexual behaviors: a young man may live in a household where the household head has a good income, but he may not have access to that money. However, individual level income and wealth were not available. Finally, though most of the variables included in the questionnaire were sufficient to meet the objectives of this analysis, other variables or an index that served as a proxy for social status would have made this analysis more comprehensive and accurate.

In a country with a generalized AIDS epidemic such as that found in Malawi, it is important to strengthen efforts to promote protective behaviors, such as condom use. The finding that condom use was significantly associated with having ever paid for sex, and, less significantly, among men who were absent from home for over a month in the past year indicates that there seems to be some awareness about using condoms among those possibly involved in riskier sexual behaviors. It was also clear that higher education was associated with condom use, which is consistent with literature on this subject[14]. Though it was not the purpose of this study, further research with these data should explore barriers of less educated men with regards to condom use, since knowledge is not the issue: knowledge of HIV/AIDS and knowledge about condoms is high for all men. However, efforts must be made to identify and address the barriers faced by men with less education to using condoms in order to properly intervene. Moreover, this study supports previous research that finds that men in occupations of higher status are more likely to have a higher number of sexual partners. We found that men from all different occupational groups were more likely to have had a higher number of sexual partners in the past year than men with no paid occupation, and businessmen and fishermen, the two subgroups with most status, had the highest

number of sexual partners. Since these men are not more likely to be paying for sex, they are either more sought after by women, as reported in some studies, or are seeking additional partners[12]. This in turn leads to the observation that improving economic opportunities for women may reduce their need to seek or rely on men who can provide them with financial support, such as the men with higher occupational status, or who may pay them for sex. Finally, it is clear that the issues and needs faced by men of various occupational sub-groups are different. Thus, program interventions to reduce infection risk-related sexual activity among men in Malawi may be usefully targeted at particular occupational sub-groups.

Acknowledgements

REFERENCES

1. UNAIDS. *Malawi – Epidemiological Fact Sheet on HIV/AIDS and Sexually Transmitted Infections, 2004 Update* [cited 8 Oct 2005]. Available from: http://www.unaids.org/html/pub/publications/factsheets01/malawi_en_pdf.htm

2. United States Bureau of the Census. *Estimates of HIV-1 Seroprevalence* [cited 2007 Apr 09]. Available from: http://www.census.gov/cgi-bin/ipc/idbsprd

3. National Statistical Office and Macro International. *Malawi Demographic and Health Survey 2000*. Malawi: National Statistical Office and Macro International, Inc; 2000.

4. Boerma JT, Urassa M, Nnko S, Ng'weshemi J, Isingo R, Zaba B, Mwaluko G. Sociodemographic context of the AIDS epidemic in a rural area in Tanzania with a focus on people's mobility and marriage. Sex Transm Infect. 2002;78(suppl I):i97-i105.

5. Decosas J, Kane F, Anarfi JK, Sodji KDR, Wagner HU. Migration and AIDS. Lancet. 1995;346:826-828.

6. Lagarde E, Enel C, Seck K, Gueye-Ndiaye A, Piau JP, Pison G, Delaunay V, Ndoye I, Mboup S. Religion and protective behaviours towards AIDS in rural Senegal. AIDS. 2000;14:2027-2033.

7. Orubuloye IO, Caldwell P, Caldwell JC. The Role of High-Risk Occupations in the Spread of AIDS: Truck Drivers and Itinerant Market Women in Nigeria. Int Fam Plan Perspect. 1993;19:43-48 & 71.

8. Wawer MJ, Serwadda D, Musgrave SD, Konde-Lula JK, Musagara M, Sewankambo NK. Dynamics of Spread HIV-I Infection in a rural district of Uganda. Br Med J. 1991;303(6813):1303-1306.

9. Stewart M. Rural Tanzanian youths' first intercourse is early, number of partners high. Int Fam Plan Perspect. 1995;21(1):42-43.

10. Adetunji J. Condom Use in Marital and Non-Marital Relationships in Zimbabwe. Int Fam Plan Perspect. 2000;26(4):196-200.

11. Hargreaves JR, Glynn JR. Educational attainment and HIV-1 infection in developing countries: a systematic review. Trop Med Int Health. 2002;7 (6):489-498.

12. Chirwa WC. Migrant labour, sexual networking and multipartnered sex in Malawi. Health Transit Rev. 1997;7(suppl. 3):5-15.

13. Gage AJ, Meekers D. Sexual Activity Before Marriage in Sub-Saharan Africa. Soc Biol. 1992;41(1-2):44-60.

14. Ukwuani FA, Tsui A, Suchindran CM. Condom use for preventing HIV infection/AIDS in sub-Saharan Africa: a comparative multilevel analysis of Uganda and Tanzania. J Acquir Immune Defic Syndr. 2003;34(2):203-13.

15. Kirunga CT, Ntozi JP. Socio-economic determinants of HIV sero-status: a study of the Rakai District, Uganda. Health Transit Rev. 1997;7:175-188.

16. Lurie M, Harrison A, Wilkinson D, Karim SA. Circular migration and sexual networking in rural KwaZulu/Natal: implications for the spread of

HIV and other sexually transmitted infections. Health Transit Rev. 1997;7(suppl. 3):17-27.

17. Nunn AJ, Wagner HU, Kamali A, Kengeya-Kayondo JF, Mulder DW. Migration and HIV-1 seroprevalence in a rural Ugandan population. AIDS. 1995;9:503-506.

18. Parker RG, Easton D, Klein CH. Structural barriers and facilitators in HIV prevention: a review of international research. AIDS. 2000;14(suppl. 1):S22-S32.

19. Brockerhoff M, Biddlecom A. Migration, Sexual Behaviour and the Risk of HIV in Kenya. Int Migr Rev. 1999;33(4):833-56.

20. Malawi Government. Mangochi District Profile. Limbe, Malawi: Montfort Press; 1999.

21. National Statistical Office of Malawi. Malawi: An Atlas of Social Statistics, 2002, National Statistical Office of Malawi [cited 2003 Feb 23]. Available from: http://www.nso.malawi.net/

22. Centre for Social Research, Save the Children Federation USA, Malawi Ministry of Health and Population, MEASURE Evaluation. *Avoiding Unwanted Pregnancy and Sexually Transmitted Infections: A Rural Malawi District Study.* Chapel Hill, NC: MEASURE Evaluation; 2004.

23. Food and Agriculture Organization of the United Nations. AIDS in fishing communities: a serious problem, frequently overlooked. FAO Newsroom; 2005 [cited 2007 April 6]. Available from: http://www.fao.org/newsroom/en/news/2005/100061/index.html