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Socio-economic determinants of HIV serostatus: a study of Rakai District, Uganda*

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Abstract

The objective of the study was to establish the extent to which socio-economic status affects the acquisition of HIV. Data were collected in 1992 from 1784 respondents in Rakai district by the Rakai Project, with results for HIV serology and information on demographic, socio-economic and some behavioural variables.

Level of education and urban residence were positively significantly related to HIV status both at bivariate and multivariate levels. Household wealth status was positively associated with HIV status at the bivariate level, but negatively related with HIV status at the multivariate level though not statistically significantly. Occupation was significantly associated with HIV status at the bivariate level and for one model at the multivariate level, but when occupation of the partner, travel destinations of partner and respondent, condom use and number of sexual partners in the previous year were introduced in a second model, occupation was not significantly related to HIV status.

In the past two decades, infection with Human Immune-deficiency Virus (HIV) and the subsequent fatal illness of Acquired Immune Deficiency Syndrome (AIDS), have spread rapidly throughout the world. In 1988 WHO reported over 100,000 cumulative AIDS cases, and in late 1990 the estimated number of all the infected adults was close to 8-10 million (Mann and Edstrom 1987; WHO 1990). By 1992 these estimates were up by 2 million to 10-12 million and WHO projects the numbers to be infected by the year 2000 at 40 million people (WHO/GPA 1992; McGregor 1992).

Of those infected and dying, a high proportion belongs to the developing countries of the world, especially sub-Saharan Africa. Way and Stanecki (1991) using the IwgAIDS model projected that by the year 2015, 13.8 million people will have died of AIDS in sub-Saharan Africa while Piel (1994) estimates that 200 million people will be infected by the year 2010.

Uganda is one of the worst hit countries in the world, with estimates indicating that over 1.5 million people, about 7.7 per cent of the population, are already infected (Kaijuka 1996). Rakai district, the area of interest in this study, was where the first AIDS patient was recognized in Uganda in 1982 (Serwadda et al. 1985). The report from the Ministry of

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Health's Sexually Transmitted Diseases/AIDS Control Programme (STD/ACP 1996) had the number of AIDS cases so far recorded in Rakai by the end of 1995 as 2215 comprising 2072

adults and 143 children. The HIV seroprevalence rate has been reported as 13 per cent for all adults above 13 years in the district (Sewankambo et al. 1994).

Much effort, time and money have been put into the understanding of this disease, but since it is fairly new, some of the factors responsible for its spread and which make some people more susceptible than others are still unknown. This study is an effort to understand HIV/AIDS more and therefore to be in a much better position to plan strategies against this deadly disease. For instance in almost two decades since the onset of HIV, some disease patterns should have evolved, and therefore the most susceptible people are the ones getting infected in larger numbers today. Knowledge of these patterns will help to make the picture of HIV/AIDS clearer. This study particularly looks at the socio-economic characteristics of the respondents, level of education, place of residence, occupation and wealth status, and how they affect the individual's chances of acquiring the virus.

Background information on Rakai district

The area of study is Rakai district which is situated in southwestern Uganda, bordered by Masaka district to the northeast, Mbarara district to the west, Northern Tanzania to the south and Lake Victoria to the east, and covers an area of about 5000 square kilometres. According to the 1991 Population and Housing Census the district had a population of 385,501 people, 189,082 males and 194,419 females, a sex ratio of 97.3, a population density of 99 per km^2, an annual population growth rate of 3.04 per cent between 1980 and 1991, and a total fertility rate of 7.7. The ethnic groups in the district include Baganda, Banyankore, Banyarwanda, Barundi and Bakiga. By religion, 29.6 per cent of the people of Rakai belonged to the Church of Uganda, 59.5 per cent to the Roman Catholic Church, 8.9 per cent are Muslims, and the other religions make up two per cent (Republic of Uganda 1992).

Ninety-six per cent of the population in Rakai is rural and living on subsistence agriculture, a figure well above the average for the whole country (Republic of Uganda 1992). However, the close proximity to Tanzania both by land and water over Lake Victoria, and the fact that the district is traversed by well-maintained all-weather roads makes it easily accessible. The eastern arm of the Trans-African Highway, from the Kenyan port of Mombasa through Uganda to Zaire, Rwanda and Burundi, crosses the northern part of the district, and the road to Tanzania passes through a substantial part of southeastern Rakai. This has led to the growth of towns and trading centres along these roads, the most notable being Lyantonde (5,520 people), Kyotera (5,111), Kalisizo (2,403), Mutukula (1,286) and Rakai (549) (Republic of Uganda 1992).

Method

Secondary data from the Rakai Project database were used for this study. The Rakai Project was established in 1989, as a collaboration of the Institute of Public Health and the Department of Medicine in Makerere University and the Uganda Virus Research Institute of the Ministry of Health, with the Columbia University School of Public Health and Johns Hopkins University School of Hygiene and Public Health. In addition to carrying out a longitudinal study in the district, the project organizes health rallies and community education through health workers, provides serological screening and counselling and distributes condoms.

The Rakai Project has been carrying out a population-based longitudinal HIV cohort study with collection of blood samples for HIV serology and interviews for the collection of demographic and socio-economic data annually, beginning in 1989 in the district of Rakai. These data were used in this study to better understand the interactions of socio-economic factors and HIV serostatus.

The study design was based on the smallest unit of administration in Uganda known as the Local Council One (LC1), previously referred to as Resistance Committee One (RC1), which has an average of 100 households. A two-stage stratified cluster sampling was used. In the first stage, 21 LC1s were randomly selected from a total of 780 in the district. There was over-sampling of LCs located in trading centres on the main and secondary roads to ensure adequate representation of these communities.

At the second stage, a household was randomly selected from each of the 21 LC1s and this household together with 39 contiguous households were enrolled in the study, making a total of 840 households. In 1990 the cohort was enlarged by expanding each of the 21 existing clusters by 20 contiguous households and adding ten new clusters of 60 households each, randomly selected by stratified sampling from the three geographic strata of main-road trading centres, feeder-road trading villages, and rural villages. At each survey round, we also entered new households resulting from the dispersion of families whose members were already enrolled in the study. Each study household received a baseline visit and has been followed annually for a total of six visits. At these visits, a census is conducted of all children and adults resident in the household for at least three months in a year and updated at subsequent visits. During the enumeration, basic demographic data such as age, sex and place of residence were collected; socio-economic characteristics, individuals' knowledge, behaviour and health status were recorded and a brief physical examination was undertaken. The questionnaire used in Visit 4 in 1992 probed people of 13 years and above, as these were the ones thought to be sexually active, and therefore able to acquire the infection through sexual intercourse.

A whole-blood sample was collected from consenting individuals, parents or guardians providing consent for the children under 18 years. Venipuncture whole-blood specimens are spun in the field in a portable centrifuge and the separated serum frozen in liquid nitrogen at -218ºC. The frozen specimens are transported to the Uganda Virus Research Institute (UVRI) in Entebbe, where initial screening is done using a commercial enzyme-linked immuno-assay (ELISA) and all positive samples are confirmed by Western Blot.

During Visit 4 in 1992, a total of 6878 cases were recorded, out of which only 1784 could be used for detailed analysis. In most of the recorded cases the respondents did not consent to give blood, and some, especially the young, had incomplete interviews.

Statistical analysis was carried out at the univariate, bivariate and multivariate levels using SPSS-PC package.

Results

Table 1 shows the socio-demographic characteristics of the respondents. The respondents were between the ages of 10 and 95 years, with the majority aged 20 to 50 years. There were more females (54.9%) than males (45.1%) in the sample. Place of residence of the respondent was considered according to whether it was a trading centre along a main road, a secondary-road trading village, or a rural village. Those living in the trading villages formed the largest group (44.5%). The respondents were highly mobile, with the majority of the respondents (80.6%) and their partners (74.5%) having been outside the district at least once. Baganda and those of the Catholic religion were the predominant groups by ethnicity and religion. The majority of the sample had not completed Primary 7 (51%) and 20.6 per cent had received no formal education at all. Several occupations were listed but for the purposes of this study, they were regrouped into those hypothesized to be of high or low risk in the acquisition of HIV, and a third group of occupations whose risk status could not be immediately decided. Truck and taxi drivers, fishermen, those in the forces, waitresses, barmaids and market vendors were referred to as being in high-risk occupations, compared to subsistence farmers, and government workers, who were considered to be in low-risk occupations; the remaining

groups which included the unemployed and those with unstated occupations were classed as 'others'. Most of the respondents (75.6%) and 50 per cent of their partners were in occupations hypothesized as low-risk.

Wealth status was a difficult variable to quantify. There was available at household level a record of possessions like radios and cars. Also available were the size, condition and materials used for constructing the house. This information was used to compute an index which was then categorized into low, medium and high wealth status. The majority of the respondents were of medium wealth status. However, it should be noted that this status is the same for all respondents in one household.

Table 1
Socio-demographic characteristics of the study sample

Variable	Frequency	
	Number	%
Sex		
Male	804	45.1
Female	980	54.9
Age group		
10-14	36	2.0
15-19	251	14.1
20-24	315	17.7
25-29	309	17.3
30-34	184	10.3
35-39	176	9.9
40-44	109	6.1
45-49	93	5.2
50-54	76	4.3
55-59	59	3.3
60+	176	9.9
Place of residence		
Trading centre	667	37.4
Trading village	794	44.5
Rural village	323	18.1
Ethnic group		
Baganda	1146	64.2
Banyankore	275	15.4
Banyarwanda	140	7.8
Barundi	42	2.4
Bakiga	97	5.4
Tanzanians	52	2.9
Other	23	1.8

Table 1 continued

Marital Status		
Married	1136	63.7
Widowed	134	7.5
Separated	98	5.5
Divorced	101	5.7

Not yet married	315	17.7
Respondent's occupation risk		
High-risk	313	17.5
Low-risk	1348	75.6
Others	123	6.9
Partner's occupation risk		
High-risk	366	20.5
Low-risk	892	50.0
Others	526	29.5
Level of education		
Secondary +	255	14.3
Completed primary	253	14.3
Some primary	909	51.0
No education	367	20.6
Religion		
Catholic	1148	64.3
Protestant	428	24.0
Muslim	187	10.5
Other	15	0.8
None	6	0.3
Wealth status		
Low	414	23.2
Medium	898	50.3
High	472	26.5
Travel of respondent		
Outside Uganda	130	7.3
Outside Rakai	1307	73.3
Within Rakai	336	18.8
Not travelled	11	0.6
Travel of partner		
Outside Uganda	88	6.4
Outside Rakai	944	68.1
Within Rakai	342	24.7
Not travelled	11	0.8

Some demographic and socio-economic characteristics were studied relative to the respondent's HIV status and Table 2 shows the results. Almost a quarter of the females compared to less than a fifth of the males were seropositive and HIV prevalence increased with age up to 30 years and declined thereafter. The more the respondent was educated the higher the likelihood of being seropositive. Residents of the trading centres had the highest rates of HIV positivity (31.3%), with those in trading villages next (17%), and the rural village residents had the lowest rates (13.9%).

Occupation both of the respondent and the partner was found to be significantly associated with HIV status. Individuals hypothesized as high-risk were found to be about twice as likely to be HIV-positive as those hypothesized as low-risk. Respondents of low wealth status were observed to be least seropositive (16.9%), 22.2 per cent of those with medium wealth status and slightly over a quarter of respondents of high wealth status were HIV-positive. Mobility of the respondent and the partner as measured by farthest destination by national and international borders traversed had significant HIV differentials. Those who

had been, or whose partners had been outside the country had the highest rates of seropositivity (27.7 and 36.4 % respectively). The eleven respondents who had never moved outside their parishes were all negative for HIV antibodies and only one respondent of those whose partners had never moved out of the parish was HIV-positive. All the variables in Table 2 were found to be significantly associated with HIV serostatus at the bivariate level.

Table 2
Percentage of respondents who are HIV positive by socio-demographic characteristics

Variable	HIV+		Total	X^2 df (p)
	Number	%		
Sex				
Male	146	18.2	804	11.4_1
Female	243	24.8	980	(0.0007)
Age				
10-14	1	2.8	36	129.5_{10}
15-19	36	14.3	251	(0.0000)
20-24	99	31.4	315	
25-29	112	36.2	309	
30-34	56	30.4	184	
35-39	32	18.2	176	
40-44	20	18.3	109	
45-49	14	15.1	93	
50-54	6	7.9	76	
55-59	6	10.2	59	
60+	7	4.0	176	
Level of education				
Secondary +	75	29.4	255	38.4_4
Complete primary	70	27.7	253	(0.0000)
Some primary	203	22.3	909	
No education	41	11.2	367	
Place of residence				
Trading centre	209	31.3	667	58.0_2
Trading village	135	17.0	794	(0.0000)
Rural village	45	13.9	323	
Respondent's occupation risk				
High-risk	121	38.3	316	63.9_2
Low-risk	239	17.7	1348	(0.0000)
Others	29	24.2	120	

Table 2 continued

Partner's occupation risk				
High-risk	118	32.2	366	31.7_2
Low-risk	160	17.9	896	(0.0000)
Others	111	21.3	522	
Wealth status				
Low	70	16.9	414	9.5_2
Medium	199	22.2	898	(0.0086)
High	120	25.4	472	

Respondent's travel				
Outside Uganda	36	27.7	130	25.8_3
Outside Rakai	311	23.8	1307	(0.0000)
Within Rakai	42	12.5	336	
Not travelled	0	0.00	11	
Partner's travel				
Outside Uganda	32	36.4	88	17.7_4
Outside Rakai	221	23.4	944	(0.0014)
Within Rakai	59	17.3	342	
Not travelled	1	9.1	11	
Not stated	50	19.9	251	

Bivariate analysis was also done between seropositivity and sexual behaviour, as represented by willingness to use condoms in future, use of condoms in the past year, and number of sexual partners in the previous year. The results of the analysis are shown in Table 3. Those willing to use and those who had ever used condoms showed higher rates of seropositivity than those not willing to use and who had never used condoms. The more sexual partners reported by the respondent, the higher the rate of HIV positivity. Both willingness to use condoms and the number of sexual partners are significantly associated with HIV serostatus.

Table 3
Percentage of respondents who are HIV-positive by sexual behaviour

Variable	HIV+		Total	X^2 df
	Number	%		(P-value)
Willing to use condoms?				
Yes	118	27.3	432	3.9_1
No	258	22.6	1144	(0.0479)
Condom ever-use				
Yes	37	26.1	142	1.6_1
No	352	21.4	1642	(0.2010)
Sexual partners				
None or one	181	19.3	315	17.7_3
2-5	108	29.4	367	(0.0005)
More than 5	5	35.7	14	

Given the importance attached to condom use as an intervention measure in HIV prevention programs, respondents were further studied to investigate the association between ever-use of condoms, HIV positivity and some socio-demographic characteristics. Table 4 shows the results. While the non-condom users show significant association between the level of education and seropositivity, the condom users do not. Similar results apply to occupation and wealth status. For the variable of place of residence, there is significant association with HIV positivity among both condom and non-condom users.

Table 4
Percentage of respondents who were HIV-positive by condom ever-use and selected socio-demographic characteristics

Variable	Condom users		Non condom users	
	HIV+	X2 df	HIV+	X2 df

	N	%	(P-value)	N	%	(P-value)
Level of education						
Secondary +	11	22.4	2.7_3	64	31.1	39.7_3
Complete primary	7	24.1	(0.4402)	63	28.1	(0.0000)
Some primary	18	32.7		185	21.7	
No education	1	11.1		40	11.2	
Place of residence						
Trading centre	30	40.5	17.3_2	179	30.2	43.5_2
Trading village	7	11.7	(0.0002)	128	17.4	(0.0000)
Rural village	0	0.0		45	14.3	
Wealth status						
Low	2	13.3	1.8_2	68	17.0	7.2_2
Medium	14	25.0	(0.4170)	185	22.0	(0.0269)
High	21	29.6		99	24.7	
Occupation risk						
High-risk	12	19.4	2.6_2	227	17.7	61.1_2
Low-risk	20	31.3	(0.2772)	99	39.8	(0.0000)
Others	5	31.3		26	24.3	

The results of the bivariate analysis are not conclusive and in some cases are unexpected. To get more conclusive results, two logistic regression models were run, the first one with the socio-economic variables basic to this study: level of education, place of residence, occupation, household wealth status, age and sex of respondent. The second model included all the variables in Model 1 plus partner's occupation, respondent's and partner's travel, sex partners in past year and condom ever-use. The last five variables were considered to be confounding the relationship between the socio-economic characteristics and the dependent variable, HIV status. The results of the two models are summarized and compared in Table 5.

According to Model 1 of Table 5, more education, living in a trading centre or trading village, high-risk occupation, being a female and belonging to the middle age groups of 20-35 years are significantly related to seropositive status while more wealth is negatively related to HIV-positive status. With the introduction of five more variables to the model, Model 2 shows that with the exception of the respondent's occupation, the pattern of most results in Model 1 does not change, but the magnitude of the Beta coefficients changed. Some of the new variables, risky partner's occupation, more sexual partners and non-condom use, are significantly positively related to HIV seropositivity.

Table 5
Results of logistic regression assuming Model 1 (six independent variables) and Model 2 (11 independent variables)

Variable	Model 1			Model 2		
	Beta regression coefficients	Sig (p)	Exp(B) odds ratios	Beta regression coefficients	Sig (p)	Exp(B) odds ratios
Level of education		.040			.008	
Secondary +	.6972	.006	2.01	1.0572	.001	2.88
Complete primary	.5797	.019	1.79	.7922	.009	2.21
Some primary	.5013	.013	1.65	.7520	.003	2.12

No education			1.00			1.00
Place of residence		.000			.019	
Trading centre	.6432	.002	1.90	.5893	.021	1.80
Trading village	.0673	.732	1.07	.1106	.622	1.12
Rural village			1.00			1.00
Wealth status		.082			.285	
High	-.3252	.122	.72	-.3707	.142	.69
Medium	.0215	.900	1.02	-.1137	.575	.89
Low			1.00			1.00
Respondent's occupation risk		.000			.142	
High-risk	.6724	.000	1.96	.3496	.061	1.42
Low-risk	.3265	.180	1.39	.3215	.299	1.34
Others			1.00			1.00
Sex						
Female	.4445	.0007	1.56	.6881	.001	1.99
Male (ref)			1.00			1.00
Age		.0000			.000	
10-14	-.8417	.437	.43	-.1395	.904	.87
15-19	.9483	.030	2.58	.5214	.339	1.68
20-24	1.9177	.000	6.81	1.7642	.001	5.84
25-29	2.1298	.000	8.41	2.0034	.000	7.41
30-34	1.9800	.000	7.24	1.9259	.000	6.86
35-39	1.3317	.003	3.79	1.2425	.018	3.46
40-44	1.3963	.003	4.04	1.3085	.018	3.70
45-49	1.3382	.006	3.81	1.2244	.032	3.40
50-54	.5289	.364	1.70	.4523	.500	1.57
55-59	.9827	.092	2.67	.9763	.145	2.65
60+ (ref)			1.00			1.00
Partner's occupation risk					.017	
High-risk				.6352	.082	1.44
Others				.6825	.008	1.98
Low risk (ref)						1.00

Table 5 continued

Partner's travel					.0261	
Outside country				.5670	.142	1.76
Outside Rakai				-.3348	.128	.72
Not stated				-.3531	.284	.70
Within Rakai (ref)						1.00
Sex partners in past year					.000	
2-5				.8689	.000	2.38
More than five				.7755	.004	2.17
None or one (ref)						1.00
Condom ever-use						
Yes				-.5305	.0502	.59
No (ref)						1.00
Constant	-3.9166	.4342	.00	-4.3522	.552	.00

Discussion

It can be seen from Table 1 that the majority of the respondents had received less than full primary education, with a sizable proportion who were uneducated. Those who had completed primary education were about equal to those who had at least secondary education. At bivariate level in Table 2, education was found to be highly significantly associated with HIV status (p=.0000). The higher the respondents' level of education, the more likely they were to acquire HIV. In Table 3 level of education was significantly associated with condom ever-use, with the better educated also being more likely to use condoms.

Furthermore at the multivariate analysis, the level of education was still significantly related to HIV status and maintained the linear positive trend as observed by the odds ratios, even when explanatory variables including condom use were introduced in the model. This is in agreement with what some researchers have noted in other parts of Africa: in Zambia and Rwanda (Over and Piot 1991) and Tanzania (Aslam 1994) although Waldman (1995) claims the opposite in the Black population in South Africa. The positive relationship between level of education and rate of seropositivity is due to education making the individuals more attractive, encouraging them to abandon traditional norms and values and increasing their mobility. Unfortunately this exposure to HIV of the educated is not counterbalanced by condom use, which is still limited (8% of ever use).

Regarding occupation, Table 2 shows that it was significantly associated with HIV status at the bivariate level, at p=.0000, with those referred to as of high risk showing the highest proportions of HIV positivity and those of low risk showing the least. The high-risk category includes truck and taxi drivers, fishermen, those in the forces, waitresses, barmaids and market vendors. The low-risk category includes subsistence farmers and government workers. The unemployed and those with unstated occupations were referred to as others. This pattern was also observed at multivariate level in the first model where occupation interacts with five other variables, place of residence, sex, age, education and wealth status. Long-distance truck drivers and prostitutes have previously been noted to be at higher risk of acquiring HIV (Ramasubhan 1992; Orubuloye, Caldwell and Caldwell 1993, 1994). In this study waitresses and barmaids were used as proxies for prostitutes. However when other explanatory variables of HIV positivity like partner's occupation, respondent's and partner's travel, number of sexual partners and condom use in past year, are introduced in the model, the respondent's occupation ceases to be significantly related to HIV status. This seems to suggest that one or more of the explanatory variables, possibly the partner's occupation, explained better the relationship between occupation and HIV status. The relationship could also have been altered by inclusion of condom use, since people in the high-risk occupations were seen to be more informed about and willing to use condoms at bivariate level. This is an important finding which can be useful in strategies to combat further HIV spread among these high-risk groups.

The sample was divided into three geographical strata: trading centres, trading villages and rural villages. The trading villages had the majority of respondents. At bivariate level the place of residence of the respondent was significantly associated with HIV status and condom ever use (p=.0000). Respondents resident in the trading centres showed the highest proportion with positive results and those resident in the rural villages the smallest percentage positive (X^2 linear trend p=.0000) (Table 2). The results of logistic analysis confirmed that the place of residence is significantly related to seropositivity and those residing in trading centres were significantly more likely to acquire HIV than those in the rural villages. Thus staying in a trading centre, even when level of education, wealth status, occupation, age, sex and number of sexual partners are taken into account, remains a high-risk factor for the respondent (Table 5). Controlling for condom ever-use at bivariate level in Table 3 showed that the limited use of condoms by the people staying in trading centres was not enough to prove an advantage over those staying in rural villages. The results do not change in the multivariate analysis with

condom use as one of the factors in Model 2 shown in Table 5. A possible explanation for this is that HIV/AIDS was originally introduced into Rakai through these trading centres as points of interaction with people from outside this district. This implies that the residents of the trading centres have not taken advantage of their exposure to international highways to pick up practices like condom use, at sufficiently high levels to protect them from AIDS. The latter explanation is supported by reports from focus group discussions in this area by Konde-Lule, Musagara and Musgrave (1993).

Household wealth status was used as a proxy for the individual income in this study. Respondents were divided into low, medium and high household wealth status, depending on property in the household and state of the house they were living in. This categorization is relative rather than absolute. The majority of the respondents were of medium wealth status. At bivariate level, higher wealth status was significantly associated with HIV status (p=.0086). However at the multivariate level, the results in Table 5 are reversed, showing that high wealth status is negatively related to HIV positivity although not significantly. This finding is unexpected because it is believed that more wealthy people than poor people have been dying of AIDS. It appears that there are some confounding variables such as condom use and number of sexual partners. Bivariate analysis relating condom use and wealth status shows significant positive association, which indicates that the wealthy are protected by condoms more than the poor. Additionally, number of sexual partners is positively associated with the level of wealth of the respondent's household (p=.0000), which implies that introduction of the former variable has an effect on the relationship between the latter variable and serostatus. Another possible explanation for the poor appearing to be more exposed to HIV is that the wealth index used is not very personal, as it is a household indicator, whereas HIV status is a very personal and individual marker.

Not surprisingly the findings from the multivariate analysis confirm the bivariate-level results that sex is related to HIV status. In Model 1, the odds ratio show that a female in Rakai district is 1.56 times more likely to be HIV infected than a male. With the introduction of confounding variables such as respondent's and partner's mobility and number of sexual partners, the odds ratio of the female being seropositive is twice that of the male. Inclusion of these variables shows increased likelihood of the female being HIV-positive. This means that the odds ratios of female infection are higher in this study than hitherto found (e.g. Berkley et al. 1990). A look at the bivariate associations helps to understand this. The males, though more likely than the females to have more than one sexual partner, are also more likely to use condoms, twice as likely as females (p=.0000), and showed less mobility within the district.

Another expected outcome is the relationship of age and HIV status. In both models those aged 20-35 years are the most likely to be HIV positive. This is in conformity with previous results that age groups 20-35 are the most vulnerable to HIV, while those in older ages (45+) and the younger ages below 15 are least affected (Nunn et al. 1994).

Of the variables added to Model 1, only the number of sexual partners and condom use are significantly related to HIV status. Expectedly the number of sexual partners in the past year is positively related to seropositivity, both at bivariate and multivariate levels of analysis.

Not surprisingly the ever-use of condoms is negatively related to HIV positivity at multivariate analysis (Table 5) although the reverse pattern was observed at bivariate level (Table 3). The multivariate finding is encouraging news that use of condoms is helping people in Rakai following a decade of condom intervention.

Conclusion and recommendations

What this study reveals, therefore, is that although higher levels of education, urban residence, and certain occupations make the respondent more likely to acquire HIV, higher wealth status is not clearly a risk factor. This seems contradictory.

However, this need not necessarily be the case. Though higher wealth status exposes people to travel, urban residence, and more potential sex partners, it also gives them more access to information and education about health hazards like HIV and puts them in a better position than the poor to look after themselves. The wealthy are able to look for and receive treatment in the case of any illness, which for STDs is beneficial and will make the respondent less likely to acquire HIV. The individual can also afford to be selective about sexual partners and may not have to resort to prostitutes in the case of males, and high-risk men like truck drivers in the case of females. The individual can also afford condoms, which may not be the case for those of low wealth status.

Recommendations can be divided into short-term and long-term. The short-term recommendations include emphasis on health education, which should be multi-pronged to target the different groups involved. For example the educated and those living in urban areas who are particularly at risk, can be reached through television, newspapers, films and plays. Peer groups can also be effective, especially for the adolescents in schools. The rural and largely semi-educated or uneducated people need a different approach: the radio and rural health personnel are a better means of communication to this group.

There is need to encourage the young to postpone sexual activity in order to reduce the high prevalence of HIV positivity among females below 20 years old as suggested by the findings. This calls for peer counselling of the youth in schools and accessibility of condoms to the adolescents.

People should be encouraged to use condoms and use them consistently, especially with non-spouses. There is a need to educate the people on how to use condoms and to help them overcome prejudices against them. The condoms should be easily available even to rural people and in outlets to which they can go easily and without stigma, like retail shops. They should be very cheap, so that most people can afford them.

The long-term strategy against HIV is improvement of the people's economic circumstances in general and reducing females' poverty in particular. Such improvement will make females less economically dependent on men, and hence less vulnerable to sexual exploitation.

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