Church and Clubs: Influence on Secondary Abstinence in KwaZulu-Natal, South Africa – 1999-2001

Lisanne Brown, Ali Mehryar Karim, Paul Hutchinson, Sohail Agha, Kate MacIntyre, and Robert Magnani, Tulane University, Department of International Health and Development, School of Public Health and Tropical Medicine

INTRODUCTION

Abstinence from sex is one of the key behavioral strategies that youth can adopt to protect themselves from pregnancy and STDs, in particular HIV. While numerous studies have looked at abstinence in terms of delay in sexual initiation (either until marriage or until older) (e.g., Thomas, 1999 and Meier 2003), few studies have examined the dynamics of secondary abstinence, that is cessation (either temporary or permanent) of sexual activity among those who have initiated sex. Moreover, the large majority of abstinence research has been conducted in developed countries. Religiosity an membership in social clubs are factors thought to influence sexual behavior (Meier 2003, Gregson, et al 1999)

Using panel data from KwaZulu-Natal South Africa, this paper examines trends in secondary abstinence among young adults, focusing on the influence of religiosity and participation in sports and other social clubs.

DATA AND METHODS

The data for this paper is derived from a two-wave panel study called 'Transitions to Adulthood in the Context of AIDS in South Africa' conducted in KwaZulu-Natal, the largest province of South Africa by population. Two administrative areas within the province of KwaZulu Natal were chosen for the study. These were the Durban Metropolitan and Mtunzini magisterial districts. The Durban population was urban while the Mtunzini population was mostly rural. Adolescents and households were surveyed from the two domains using a modified multi-stage cluster sampling approach described by Turner, Magnani, and Shuaib (1996). At the first stage, 120 enumeration areas (EA) were chosen with the probability proportional to size. At the second stage, the selected PSUs were divided equally into 4-6 segments of a predetermined size (based on an estimate for the average number of adolescents that could be found per household), and one segment was selected randomly.

During the first wave of data collection, all young persons between the ages of 14-22 years and their households in the selected segment were eligible for the adolescent and household questionnaires respectively. The first wave of data collection was conducted from September to November 1999, and a total of 3,052 adolescents from 1,974 households were interviewed. The second wave of data collection was performed from September to November 2001. The eligible criteria for the second wave of data collection was 1) adolescents who were interviewed during wave one, and 2) all the other young adults in the ages 14-22 years living in the selected segments during the survey period. Therefore, the second wave of data collection involved revisiting the segments (i.e. PSUs) from wave one, plus tracking wave one respondents who moved away. A total of 4,185 young adults between the ages 14-24 years in 2,447 households were interviewed during the second wave. The follow-up rate of the wave one respondents was 73 percent. To yield the maximum possible sample size, a pooled cross-sectional analysis was chosen for the purpose of this study. The 296 wave two respondents who were 23 years of age or older were excluded to maintain age symmetry between the two waves.

Dependent Variable

The primary dependent variable 'secondary abstinence' was defined as sexually initiated youths reporting no sexual partner during the 12 months preceding the survey. As secondary abstinence was only observed among the sample of the young adult population who were sexually active, a second dependent variable – whether or not the young adult had ever had sex – was also used in the estimations for the presence of sample selection.

Independent Variables

The independent variables considered for this study are listed in Table 1. These included an indicator variables for the survey period, age group, sex, race, religiosity, knowing someone infected with HIV or knowing someone who died of AIDS, whether or not the respondent was in school during the 18 months preceding the survey, whether or not the respondent belonged to specific social institutions, household socio-economic status, co-habiting with parents status, education level of household head, and whether the household was headed by a female.

The household socio-economic status was measured using an index created from three ordinal variables from the household questionnaire. These three variables were monthly

household expenditure on food, rent, and annual household expenditure of other items (eg. clothes, furniture etc.). Principal component analysis was used to construct the index. The internal reliability of the index using Cronbach's alpha was 0.77. The higher score of the index indicated higher socio-economic status of the respondents. The index was divided into five equal quintiles, and the highest scoring one-fifth of respondents were classified as having high socio-economic status, while the rest were classified as having low socio-economic status.

Belonging to social institution was created as an ordinal variable based on respondents' participation in sports, study and religious groups. A value of '0' (zero) indicated that the respondent did not belong to any of the three social groups, the value '1' indicated that the respondents belonged to any one of the three social groups, the value '2' indicated that the respondent belonged to two of the social groups, and so on.

[Table 1 here]

Modeling Strategy

The binary response outcome variable secondary abstinence was analyzed using maximum likelihood probit estimation. Due to the complex study design, the outcome could be correlated within clusters, within households and within individuals (i.e. the panel respondents). Taylor series linearization technique was used to adjust for the different levels of unobserved heterogeneity (Angeles and Mroz 2001; Angeles, Guilkey, and Mroz 2002; StataCorp, 2001). The differential sampling probabilities of the respondents during each survey period were adjusted using sampling weights.

Since the outcome measure of secondary abstinence was observed only among sexually initiated respondents, the threat of 'sample selection bias' was considered to be a possibility. This would be occur if unobserved factors (such as fear of HIV infection or greater exposure to riskier socio-cultural contexts) were to have a common correlation with the sample selection process (i.e. sexual initiation) and the behavioral outcome (i.e. secondary abstinence) under study (Berk 1983; Heckman 1979; Winship and Mare 1992). Under such a scenario, parameter estimates would be biased and inconsistent when the sample of sexually initiated youths differed from the sample of non-sexually initiated youths in ways – not captured by measured variables - that were also associated with secondary abstinence. Heckman's sample selection probit model proposed by Van de Ven and Pragg (1981) was used to assess the correlation between the unobservable factors affecting sexual initiation and those affecting secondary abstinence. This

procedure involves estimating a selection equation – sexual initiation – simultaneously with censored outcome – secondary abstinence. The Heckman sample selection probit then allows for the correlation between the two equations to be modeled explicitly in the selection equation by incorporating the inverse Mill's ratio. The estimated coefficient on the inverse Mill's ration then represents the degree of correlation in the error terms for the two equations and is subject to standard hypothesis testing in the manner of the model's other parameters. If sample selection bias were detected, then the Heckman's selection probit model would provide unbiased and consistent parameter estimates of secondary abstinence. If no sample selection bias were detected, then the simple probit model determining secondary abstinence among sexually initiated respondents would be considered consistent.

All independent variables were interacted with survey period to demonstrate differential effects of independent variables over time. A significant interaction term would suggest a temporal relationship between the independent variable and the dependent variable. Significant level (alpha error) of all statistical tests were set at 0.05.

RESULTS

Table 1 shows the descriptive statistics of the dependent and independent variables. The proportion of the respondents who reported ever having had sex remained similar (50 percent) during both the waves. Secondary abstinence, however, increased significantly between the two survey periods. The proportion of the sexually initiated respondent who reported secondary abstinence increased significantly from 3 percent during wave one to 10 percent during wave two. The distribution of the independent variables that changed over time included age group, household socio-economic status, knowing some with HIV infection or knowing someone who died of AIDS and belonging to social institutions. Quite a few (113 respondents during wave one, and 221 respondents during wave 2) had missing values for household information.

The Heckman sample selection probit model indicated that there was no evidence of sample selection bias in the secondary abstinence probit equation estimated among the sexually initiated respondents (the Heckman model is not shown). Therefore, consistent effect estimates of secondary abstinence were determined using simple probit model, and standard errors were adjusted (robust standard errors) using Taylor series linearization technique to account for the complex survey design. The probit model predicting secondary abstinence is given in Table 2. Table 2 also shows the determinants of sexual initiation (i.e. sample selection), also using probit

estimates with robust standard errors. To test whether the effects of the independent variables on secondary abstinence were constant across time, all independent variables were interacted with a time dummy variable, coded "0" for wave 1 (1999) and "1" for wave 2 (2001).

[Table 2 here]

Sexual initiation among the wave one respondents was higher among older respondents compared to younger respondents, among males compared to females, among Africans compared to Whites, Indians or Colored, among respondents having comparatively high socio-economic status, among respondents living with single parent or living with others compared to living with both parents. Sexual initiation among the wave one respondents was lower among respondents who were religious compared to those not so, among respondents who were in school compared to those who were not, and among respondents whose household head had high levels of education compared to those whose household head did not have any education. Except for the relationship between female-headed household and sexual initiation, none of the main effects were significantly different between baseline and follow-up.

The secondary abstinence model in Table 2 was used to estimate the adjusted probabilities of the outcome in the two survey periods for each of the different categories of the independent variables. These are presented in Table 3.

[Table 3 here]

In the baseline survey, reporting of secondary abstinence was higher among boys as compared to girls. However, the sex effect was not significantly different between the two waves. Also in the baseline survey, African respondents were less likely to report secondary abstinence compared to those who were White, Indian or Colored. However, the opposite was true in the follow-up survey. The predicted trend of secondary abstinence decreased among the non-Africans from 10 percent during the baseline to 4 percent during follow-up, while the trend increased by five-fold among the Africans from 2 percent during the baseline to 10 percent during the follow-up (see Table 3).

Respondents from high socio-economic status households were less likely to report secondary abstinence during the baseline. The relationship between socio-economic status and reported secondary abstinence level did not change between the two waves. Being religious was associated with higher levels of secondary abstinence compared to not being religious. The religiosity effect was also not significantly different between the two waves.

Belonging to social institutions was associated with a lower likelihood of reported secondary abstinence during the baseline, but the opposite was true during the follow-up survey. Although the predicted trend of secondary abstinence among those who did not belong to any social institutions during the two waves increased about two-fold from 4 percent during the baseline to 7 percent during the follow-up, the rate of increase among those who belonged to all three social groups (study, sports, and religious) during the two waves was much higher, and increased fifteen-folds from 1 percent during wave one to 15 percent during wave two.

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Table 1: Descriptive statistics of the independent and the dependent variables.

	Wave 1			Wave 2		
	Proportion	S.D.	n	Proportion	S.D.	n
Interviewed during both waves	0.63	0.48	3,052	0.50	0.50	3,889
Ever had sex	0.50	0.50	3,048	0.56	0.50	3,889
Reported secondary abstinence (among sexually initiated)	0.03	0.16	1,385	0.10	0.30	2,064
Age group						
14-16	0.40	0.50	3,052	0.33	0.47	3,889
17-19	0.36	0.48	3,052	0.42	0.49	3,889
20-22	0.24	0.43	3,052	0.25	0.44	3,889
Sex (male)	0.45	0.50	3,052	0.47	0.50	3,889
Race (Black)	0.79	0.41	3,052	0.77	0.42	3,889
20th percentile or higher socio-economic status*	0.15	0.36	3,052	0.23	0.42	3,889
Co-habiting with parents						
Both	0.46	0.50	3,013	0.39	0.49	3,692
Single	0.34	0.47	3,013	0.38	0.49	3,692
Other	0.21	0.41	3,013	0.23	0.42	3,692
Very religious	0.63	0.48	3,037	0.66	0.47	3,875
Knows someone with HIV infection or died of AIDS	0.29	0.45	3,052	0.40	0.49	3,889
In school during the 18 months preceding the survey	0.78	0.42	3,052	0.75	0.43	3,889
Education level of household head						
None	0.12	0.33	2,939	0.15	0.35	3,668
Primary or secondary	0.67	0.47	2,939	0.70	0.46	3,668
High school or higher	0.21	0.40	2,939	0.16	0.36	3,668
Female headed household	0.39	0.49	3,013	0.46	0.50	3,707
Belonging to institutions**						
None	0.59	0.49	3,052	0.35	0.48	3,889
1	0.30	0.46	3,052	0.42	0.49	3,889
2+	0.11	0.31	3,052	0.23	0.42	3,889

*The household socio-economic status index was created using average monthly expenditure on food, rent and annual expenditure on other household goods using principal component analysis (Chronbach's alpha=0.77).

**Belonging to social institution was created based on whether or not the respondents belonged to the following groups: sports, study and religious.

Note: Sample size differs due to missing values.

Table 2: Probit models predicting secondary abstinence and ever had sex.

Independent variables	Secondary abstinence			Ever had sex		
	Coef.	SE	p-value	Coef.	SE	p-value
Age group (14-16)						
17-19	-0.170	0.174	0.328	1.298	0.078	<0.001
20-22	0.132	0.217	0.543	1.732	0.109	<0.001
17-19 years X survey period	0.010	0.304	0.974	-0.307	0.193	0.112
20-22 years X survey period	-0.585	0.325	0.072	-0.179	0.222	0.418
Male (female)	0.440	0.202	0.029	0.345	0.079	<0.001
Male X survey period	-0.127	0.220	0.562	0.035	0.095	0.711
Black (other)	-0.814	0.354	0.021	0.781	0.132	0.000
Black X survey period	1.361	0.359	<0.001	-0.100	0.158	0.526
High SES (low)	-0.567	0.284	0.046	0.215	0.110	0.050
High SES X survey period	0.533	0.326	0.102	-0.227	0.145	0.118
Co-habiting with parents (both)						
Single	0.020	0.162	0.903	0.319	0.123	0.010
Other	0.201	0.200	0.313	0.290	0.106	0.006
Single X survey period	-0.014	0.241	0.955	-0.025	0.154	0.872
Other X survey period	-0.459	0.227	0.044	0.062	0.124	0.617
Very religious (not so)	0.350	0.160	0.028	-0.349	0.088	<0.001
Very religious X survey period	-0.032	0.203	0.874	0.067	0.131	0.607
Knows someone with HIV/AIDS (no)	-0.235	0.138	0.087	0.377	0.091	<0.001
Knows someone X survey period	-0.041	0.169	0.809	0.015	0.112	0.897
In school (no)	0.270	0.239	0.258	-0.641	0.102	<0.001
In school X survey period	-0.498	0.268	0.063	-0.053	0.178	0.767
Household head education (none)						
Primary/secondary	-0.326	0.207	0.116	-0.131	0.133	0.324
Higher	-0.388	0.263	0.141	-0.347	0.158	0.028
Prim./sec. X survey period	0.461	0.216	0.033	-0.013	0.149	0.931
Higher X survey period	0.498	0.333	0.134	-0.079	0.217	0.714
Female headed household (no)	-0.215	0.215	0.316	-0.127	0.087	0.145
Female head X survey period	0.101	0.250	0.687	0.256	0.121	0.034
Belonging to institutions	-0.212	0.084	0.011	0.029	0.079	0.710
Belonging X survey period	0.363	0.116	0.002	-0.095	0.099	0.339
Survey period (Wave 1)	-0.473	0.526	0.369	0.312	0.433	0.471
Constant	-1.333	0.373	<0.001	-1.076	0.217	<0.001
Log likelihood	-717.166			-3102.728		
Pseudo R square	0.117			0.315		
Sample size	3,277			6,560		

Reference categories are listed in parenthesis

Table 3: Adjusted (predicted) probabilities of secondary abstinence.

Independent variables	Wave 1	Wave 2
Full sample	0.028	0.091
Age group		
14-16	0.029	0.136
17-19	0.020	0.106
20-22	0.038	0.064
Sex		
Female	0.016	0.067
Male	0.041	0.114
Race		
Other (White/Colored/Indian)	0.097	0.038
Black	0.020	0.103
Socio-economic status		
Low	0.035	0.092
High	0.010	0.087
Co-habiting with parents		
Both	0.025	0.101
Single	0.026	0.102
Other	0.037	0.065
Religiosity		
Not/somewhat	0.017	0.063
Very	0.036	0.109
Knows someone living/died of AIDS		
No	0.033	0.110
Yes	0.020	0.069
In school		
No	0.020	0.118
Yes	0.035	0.081
Education level of household head		
None	0.049	0.075
Primary or secondary	0.025	0.095
High school or higher	0.022	0.091
Female headed household		
No	0.033	0.099
Yes	0.021	0.082
Belonging to institutions		
None	0.038	0.073
All three	0.009	0.153