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Chi Chiao
Vinod Mishra

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Trends in Primary and Secondary Abstinence among Kenyan Youth

Chi Chiao¹
Vinod Mishra²

Macro International Inc.

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Corresponding author: Dr. Chi Chiao, Dept. of Public Health, College of Medicine, National Cheng Kung University, No. 1, Ta-Hsueh Road, Tainan 701, Taiwan, ROC (Tel: +886-6-2353232, ext 5861; Fax: +886-6-2359033; Email: chichiao@mail.ncku.edu.tw).

¹ National Cheng Kung University

² Macro International Inc.

ABSTRACT

Background: Promoting sexual abstinence among never-married youth is an important component of HIV/AIDS prevention campaigns for youth in countries with generalized epidemics.

Objective: To examine trends in primary and secondary abstinence among never-married youth age 15-24 in Kenya over a ten-year period and to explore the role of HIV prevention knowledge, schooling, and contextual factors in affecting abstinence behavior.

Methods: Data were from Kenya Demographic and Health Surveys conducted in 1993, 1998, and 2003. Primary abstinence was defined as never-married youth who never had sex. Secondary abstinence was defined as never-married youth who ever had sex but not in the past year. Logistic regression models were used to estimate the effects of prevention knowledge, schooling, and contextual factors in affecting abstinence behavior, after accounting for sampling weights and clustering in the survey design.

Results: Both primary and secondary abstinence levels have risen in the past 10 years in Kenya. The abstinence levels were higher among female youth than among male youth. Multivariate analyses show that knowledge that abstinence can prevent HIV infection was positively associated with the likelihood of practicing abstinence (both primary and secondary). However, knowledge that condom use can prevent HIV infection was associated with lower abstinence practice. In-school youth were 4-5 times more likely to abstain from sex than those working (aOR=4.12; p=0.000 for female youth and aOR=4.83; p=0.000 for male youth). Not-in-school female youth were about as likely to abstain as working female youth, but not-in-school male youth were about 2 times more likely to abstain than working male youth. Muslim youth were much more likely to abstain than other youth. Female youth with weekly exposure to television and those with a secondary or higher education were significantly more likely to have abstained, whereas male youth were significantly less likely. Effects of these factors on secondary abstinence practice were generally weaker, but sexually experienced in-school male youth were significantly more likely to have abstained in the past year than sexually experienced working male youth. Effects of the contextual variables on the likelihood of abstinence were generally small and insignificant, except for primary abstinence among female youth.

Conclusions: Increasing knowledge that abstinence can prevent HIV infection and keeping youth in schools can help promote abstinence behavior. Abstinence programs need to be gender sensitive and culturally appropriate.

INTRODUCTION

Early sexual debut among youth is widespread in sub-Saharan Africa and it is known to increase the risk of teenage pregnancy, maternal and perinatal mortality, and sexually transmitted infections (STIs), including HIV (Pettifor et al., 2004). Recent studies indicate that about one-half of all new HIV infections in sub-Saharan Africa occur among youth age 15-24 (Garcia-Calleja et al., 2006; Mishra et al., 2006). An estimated 40% of women in sub-Saharan Africa have had premarital sex before age 20. Sex before marriage is much more common among young men than among young women (Wellings et al., 2006). Therefore, promoting sexual abstinence and delayed initiation of sex among never-married youth is an important component of HIV/AIDS prevention campaigns for youth in countries with generalized epidemics (Cheluget et al., 2006; Das et al., 2005; Kirungi et al., 2006; Santelli et al., 2006; UNAIDS, 2006).

Abstinence programs encourage unmarried youth to abstain from sexual activity as the best and only certain way to protect themselves from exposure to HIV and other STIs. Studies in Uganda, Kenya, and Zimbabwe have provided evidence that an increase in abstinence behaviors tends to be associated with declining HIV acquisition among young people (Cheluget et al., 2006; Kamali et al., 2000; Mahomva et al., 2006). The factors associated with early onset of sexual activity and abstinence among youth include individual socio-demographic factors, such as age, gender, educational status, and race/ethnicity (Cuffee et al., 2007; Mott et al., 1996; Stallworth et al., 2004; Steele et al., 2006), interpersonal factors related to knowledge, attitudes, beliefs, and expectations (Steele et al., 2006; Lammers et al., 2007), and family structure and parental involvement (Aspy et al., 2007; Babaloba et al., 2005; Lammers et al., 2000; Mott et al., 1996; Stallworth et al., 2004). A few studies have also highlighted the importance of school environment, peer influence, social context, and community involvement (Barnett and Parkhurst, 2005; Gregson et al., 2004; Mensch et al., 2001), but our understanding of such contextual factors in affecting youth sexual behavior in the context of HIV prevention remains limited.

In this study, we focus on the role of HIV prevention knowledge, schooling, and community characteristics in abstinence trends. We first describe trends in primary and secondary abstinence among never-married youth (age 15-24) in Kenya over a ten-year period using data from three nationally-representative surveys conducted in 1993, 1998, and 2003. We then examine differentials in primary and secondary abstinence, and how knowledge of prevention methods, school attendance, and other selected socioeconomic and contextual factors influence abstinence behavior of youth.

METHODS

Data

Data were from three Demographic and Health Surveys (DHS) in Kenya, conducted in 1993, 1998, and 2003 (CBS, 2004; NCPD, 1994; NCPD, 1999). DHS surveys are nationally representative household surveys that conduct face-to-face interviews with adult males and females in selected households. The surveys collected data on a range of subjects related to household characteristics, reproductive and child health, and sexual behaviors and HIV/AIDS. Analysis in this study focused on never-married youth age 15-24 years included in the three Kenya surveys. Because the 1993 survey did not collect data on male youth age 15-19, the analysis for male youth was limited to the 1998 and 2003 surveys. The numbers of female youth included in the analysis were 2,084 in 1993, 2,079 in 1998, and 2,017 in 2003. The numbers of male youth were 1,285 in 1998 and 1,309 in 2003.

Measures

The outcome measures were primary abstinence and secondary abstinence. Primary abstinence was defined as never-married youth age 15-24 who had never had sexual intercourse. Secondary abstinence was defined as sexually experienced never-married youth who had abstained from sex in the last 12 months.

The main explanatory variables were related to knowledge of HIV prevention methods, including knowledge that abstaining from sex can prevent HIV infection, knowledge that condom use can prevent HIV infection, and knowledge of someone who has HIV or has died of AIDS. Other explanatory variables included 1) background socio-demographic factors: age, education, work and schooling status, weekly exposure to television, religion, ethnicity, urban/rural residence, and geographical region; and 2) contextual factors: proportion of adults in the community (sample cluster) knowing someone who has HIV or has died of AIDS, proportion of adults in the community with primary completed or higher education, and proportion of households in the community owning a radio or television set. Contextual variables were constructed by aggregating data for sample households in each cluster.

Analysis

We examined trends and differentials in primary and secondary abstinence levels separately for female and male youth. Logistic regressions modeled the relationships between primary and secondary abstinence and selected individual and community characteristics. To assess abstinence trends and whether or not the effects of selected explanatory variables changed over time, we included a control for the survey year and interaction effects of selected explanatory factors and the survey year. All models were estimated using STATA 9.0 (Stata Corporation, 2005), after pooling data from the surveys (all three surveys for female youth and the last two surveys for male youth), and after accounting for sampling weights and clustering in the survey design.

RESULTS

Table 1 shows the percent distribution of never-married female and male youth included in various rounds of Kenya Demographic and Health Surveys by selected characteristics. Never-married male youth tended to be older than never-married female youth, reflecting lower female age at marriage. There has been a slight improvement in educational levels of female youth, but not of male youth. During 1998 to 2003, the proportion of youth who were not working and not attending school declined from 30% to 23% for female youth, and from 31% to 13% for male youth. The proportion of working youth correspondingly increased from 25% to 33% for female youth and from 29% to 40% for male youth during this time. There was a slight increase in the proportion of female youth watching television at least once a week, but this proportion declined some for male youth. About three-quarters of youth lived in rural areas; female youth were slightly more likely than male youth to live in urban areas.

There has been a substantial improvement in the knowledge that abstinence can prevent HIV infection. The proportion knowing that abstinence can prevent HIV infection increased from 37% in 1998 to 62% in 2003 among female youth, and correspondingly from 33% to 63% among male youth. Knowledge that condom use can prevent HIV infection increased only slightly during this period. In 2003, male youth (58%) were much more likely than female youth (41%) to know that condom use can prevent HIV infection. The percentage who knew someone with HIV or someone who had died of AIDS increased from 64% to 70% for female youth and from 59% to 68% for male youth during 1998 to 2003. In addition, there were substantial improvements in all three community-level indicators during 1998-2003 (Table 1).

Table 1: Sample characteristics and distributions of individual and contextual variables, KDHS 1993-2003 (never married youth age 15-24)					
Individual background	Female			Male	
	1993	1998	2003	1998	2003
N	2,084	2,079	2,017	1,285	1,309
Age					
15-19	71.67	74.05	70.48	63.84	60.59
20-24	28.33	25.95	29.52	36.16	39.41
Education					
Illiterate	49.78	47.42	40.98	46.27	48.05
Primary complete	18.48	19.04	22.99	18.22	18.86
Secondary +	31.74	33.54	36.03	35.52	33.08
Work and schooling status					
Working	27.59	24.59	33.33	28.61	40.32
Not working but in school	40.96	45.01	43.99	40.92	46.31
Not working not in school	31.46	30.40	22.68	30.47	13.37
Residence					
Urban	20.35	25.32	26.35	21.07	22.65
Rural	79.65	74.68	73.65	78.93	77.35
Province					
Nairobi	7.00	11.91	11.88	10.38	9.93
Central	16.11	9.90	15.29	11.38	16.16
Coast	8.66	6.15	6.65	6.32	6.28
Eastern	18.24	19.04	17.98	19.41	17.79
Nyanza	14.22	22.16	14.59	20.88	13.44
Rift Valley	20.99	19.12	20.11	20.62	23.33
Western	14.78	11.73	13.50	11.00	13.08
Religion					
Roman	33.68	28.86	28.77	29.38	24.59
Protestant	60.50	66.08	65.96	60.83	64.83
Muslim	4.08	3.52	4.41	4.20	4.70
No religion and others	1.74	1.53	0.86	5.59	5.89
Race					
Kilkuyu	23.26	17.09	24.96	18.71	23.44
Kalenjin	11.74	11.49	9.90	11.08	12.47
Lamba	13.33	13.98	12.54	12.50	13.72
Luhya	16.47	14.65	16.42	13.91	15.27
Luo	9.33	11.10	11.06	14.36	10.82
Others	25.86	31.68	25.12	29.44	24.48
HIV prevention knowledge					
Abstinence belief					
Yes	20.79	37.15	62.01	32.98	63.29
Condom use belief					
Yes	21.67	35.33	40.65	56.27	58.28
Knowing someone with HIV					
Yes	37.20	64.02	70.37	58.99	68.29
Mass media exposure					
Weekly TV exposure					
Yes	23.52	32.50	38.00	46.85	40.24
Contextual variables					
Knowing somebody with HIV					
Low : 0-0.49	62.53	9.63	7.71	16.22	12.56
Median : 0.5-0.74	32.45	41.97	29.26	36.72	24.16
High : 0.75 +	5.02	48.40	63.03	47.06	63.28
Community education					
Low : 0-0.74	18.19	8.87	5.91	7.24	8.79
Median : 0.75-0.89	38.14	26.73	16.76	27.45	29.59
High : 0.90 +	43.67	64.40	77.33	65.31	61.62
Households with a radio or TV					
Low : 0-0.69	62.77	43.89	14.69	40.32	22.36
Median : 0.70-0.89	23.32	33.65	43.28	32.62	30.92
High : 0.90 +	13.90	22.46	42.03	27.06	46.72

Abstinence Levels and Trends

Tables 2 and 3 present distributions of abstinence prevalence by selected explanatory variables, separately for female and male youth. Female youth in Kenya were much more likely to abstain from their first sex than male youth. In 2003, 63% of never-married female youth reported never having had sexual intercourse compared with only 37% of never-married male youth. Over time, primary abstinence among female youth increased from 54% in 1993 to 58% in 1998, and 63% in 2003. For male youth, primary abstinence increased only slightly from 34% in 1998 to 37% in 2003. Older youth, working youth, those regularly exposed to television, those with knowledge that condom use can prevent HIV, and those who knew someone who had HIV or someone who had died of AIDS were less likely to have abstained from sex. The primary abstinence levels were much higher among youth who were attending school and among those with knowledge that abstaining from sex can prevent HIV infection.

Secondary abstinence levels were also somewhat higher for females (41%) than for males (35%). The proportion of female youth reporting secondary abstinence increased from 24% in 1993 to 30% in 1998, and 41% in 2003. The proportion reporting secondary abstinence among male youth increased much more rapidly, from 14% in 1998 to 35% in 2003. Differentials in the practice of secondary abstinence were similar to those for primary abstinence in most cases, as discussed above.

Table 2: Percentage of primary and secondary abstinence prevalence, by individual and contextual variables among never-married female youth, KDHS 1993-2003

Individual background	Primary			Secondary		
	1993	1998	2003	1993	1998	2003
Total	54.48	58.36	62.95	23.76	29.64	41.12
Age						
15-19	64.53	67.67	72.10	21.33	27.67	35.50
20-24	29.09	31.81	41.09	26.83	32.31	47.44
Education						
Illiterate	62.75	64.57	70.19	21.57	26.08	42.83
Primary complete	41.31	45.74	48.27	22.87	34.71	39.09
Secondary +	49.23	56.77	64.08	26.86	30.16	41.36
Work and schooling status						
Working	37.77	41.22	45.47	21.43	33.23	40.29
Not working but in school	77.92	78.75	83.98	23.88	21.82	38.07
Not working not in school	38.61	42.02	47.74	25.85	30.93	44.22
Residence						
Urban	51.12	48.58	57.54	18.16	27.52	43.78
Rural	55.34	61.68	64.88	25.33	30.61	39.96
Province						
Nairobi	47.12	48.89	53.70	10.91	33.33	40.75
Central	50.66	54.70	66.73	28.54	26.82	44.77
Coast	73.31	75.36	77.61	11.48	22.42	27.89
Eastern	48.37	62.35	60.54	32.93	28.34	39.73
Nyanza	40.85	56.73	50.72	16.58	29.33	35.70
Rift Valley	61.52	56.21	68.81	30.66	29.69	47.39
Western	61.72	62.32	67.28	16.12	32.59	44.03
Religion						
Roman	52.88	54.63	57.98	21.91	27.56	36.53
Protestant	53.34	58.55	63.60	24.90	30.50	43.36
Muslim	85.98	78.68	82.94	13.27	21.88	36.19
No religion and others	48.36	75.32	71.96	24.18	61.44	63.67
Race						
Kilkuuyu	50.29	52.45	65.69	23.39	29.90	44.22
Kalenjin	61.82	58.22	72.85	27.46	28.66	36.73
Lamba	50.06	65.17	69.57	35.53	29.55	38.76
Luhya	58.77	59.07	61.88	20.39	24.95	47.93
Luo	39.08	40.17	50.21	15.59	28.00	30.63
Others	60.28	64.70	63.80	22.28	33.53	42.46
HIV prevention knowledge						
Abstinence belief						
No	51.92	53.35	52.67	21.82	29.31	35.93
Yes	60.90	66.09	68.75	33.84	30.12	45.66
Condom use belief						
No	59.17	67.60	72.34	27.73	33.33	42.23
Yes	34.36	40.65	48.49	15.39	25.78	40.01
Knowing someone with HIV						
No	58.48	63.73	68.50	23.71	27.06	43.50
Yes	46.06	54.67	60.01	23.99	30.49	39.83
Mass media exposure						
Weekly TV exposure						
No	54.20	60.53	63.46	25.19	32.28	39.70
Yes	55.45	53.86	62.03	19.35	25.29	43.33
Contextual variables						
Knowing somebody with HIV						
Low : 0-0.49	57.81	73.98	67.16	25.99	32.82	45.26
Median : 0.5-0.74	50.99	57.75	63.26	20.89	26.94	38.93
High : 0.75 +	35.59	55.80	62.28	19.71	31.51	41.67
Community education						
Low : 0-0.74	53.29	62.53	75.51	19.40	26.16	49.60
Median : 0.75-0.89	59.22	59.26	61.93	24.94	26.50	43.39
High : 0.90 +	50.85	57.42	62.20	24.61	31.31	40.21
Households with a radio or TV						
Low : 0-0.69	55.69	59.91	71.29	25.73	28.98	38.91
Median : 0.70-0.89	49.62	55.61	59.48	21.57	31.81	45.47
High : 0.90 +	57.14	59.47	63.59	18.89	27.37	36.72

Table 3: Percentage of primary and secondary abstinence prevalence, by individual- and community-level characteristics among never-married male youth, KDHS 1998-2003				
Individual background	Primary		Secondary	
	1998	2003	1998	2003
N	33.93	36.66	13.97	35.17
Age				
15-19	46.41	49.89	13.90	41.48
20-24	11.76	16.34	14.04	29.37
Education				
Illiterate	47.08	43.98	10.38	35.33
Primary complete	22.75	28.28	13.00	32.82
Secondary +	22.41	30.77	17.66	36.37
Work and schooling status				
Working	14.14	16.36	8.72	25.91
Not working but in school	54.69	56.80	18.29	49.65
Not working not in school	24.72	27.83	16.17	37.55
Residence				
Urban	25.07	31.63	25.86	26.13
Rural	36.32	38.11	10.19	38.06
Province				
Nairobi	17.65	34.25	33.33	28.46
Central	34.86	49.48	13.25	39.00
Coast	30.10	40.54	9.96	22.23
Eastern	38.03	40.28	16.83	48.04
Nyanza	28.64	45.88	9.21	34.30
Rift Valley	29.56	15.95	9.37	29.47
Western	61.25	43.05	4.20	40.63
Religion				
Roman	34.25	31.30	15.69	29.04
Protestant	33.94	38.56	14.62	39.35
Muslim	37.56	48.54	4.61	26.55
No religion and others	29.40	28.71	5.20	25.19
Race				
Kikuyu	31.08	41.12	17.48	34.68
Kalenjin	32.94	14.97	8.63	37.39
Lamba	42.37	40.80	17.14	46.49
Luhya	49.43	37.36	7.26	35.62
Luo	26.13	36.86	13.42	31.69
Others	28.93	40.62	15.13	28.95
HIV prevention knowledge				
Abstinence belief				
No	26.82	32.65	12.13	31.37
Yes	46.25	38.59	19.07	37.62
Condom use belief				
No	50.10	53.06	15.93	47.12
Yes	20.19	24.45	13.02	29.87
Knowing someone with HIV				
No	42.72	47.74	18.08	42.98
Yes	26.66	31.06	11.84	32.48
Mass media exposure				
Weekly TV exposure				
No	44.18	40.01	11.43	37.72
Yes	22.40	31.75	16.02	31.96
Contextual variables				
Knowing somebody with HIV				
Low : 0-0.49	40.67	48.58	16.24	50.36
Median : 0.5-0.74	34.92	34.21	15.80	29.06
High : 0.75 +	30.83	35.22	11.95	35.14
Community education				
Low : 0-0.74	37.17	38.40	8.40	39.98
Median : 0.75-0.89	36.91	40.71	13.55	35.69
High : 0.90 +	32.33	34.47	14.70	34.29
Households with a radio or TV				
Low : 0-0.69	34.58	36.23	10.32	38.06
Median : 0.70-0.89	32.15	34.31	15.44	32.46
High : 0.90 +	35.12	38.40	17.51	35.63

Factors Associated with Abstinence

Tables 4 and 5 present adjusted effects (odds ratios) of selected socio-demographic and contextual factors on the likelihood of practicing primary and secondary abstinence, separately for female and male youth. Prevention knowledge about abstinence was associated with increased likelihood of practicing primary abstinence for both female and male youth (aOR=1.32; p=0.070 for female youth and aOR=2.35; p=0.000 for male youth). Yet, knowledge that condom use can prevent HIV infection was associated with lower likelihood of abstinence practice (aOR=0.37; p=0.000 for female youth and aOR=0.41; p=0.000 for male youth). Knowing someone with HIV or someone who had died of AIDS was also associated with lower odds of primary abstinence for both female and male youth (aOR=0.75 for female youth and aOR=0.60 for male youth). Weekly TV exposure and rural residence were associated with significantly lower odds of primary abstinence for male youth, but not for female youth.

At the community level, a greater proportion of adults knowing someone with HIV or someone who had died of AIDS was associated with lower odds of abstaining, again partly due to reverse causality (communities with lower levels of abstinence are likely to have higher levels of HIV infections and AIDS deaths). Both female and male youth were somewhat more likely to abstain in communities with a greater proportion of households owning a radio or television.

Year of survey was strongly positively associated with increased likelihood of abstinence practice for female youth, but not male youth. The interaction between survey year and knowledge of abstinence was positive and significant for female youth, indicating that increased knowledge that abstinence can prevent HIV infection has contributed some to increased practice of abstinence among females. However, there was not much change in the primary abstinence level in males in last five years, and the effect of the interaction term was insignificant.

With other factors controlled, older youth (age 20-24) were much less likely to abstain from their first sex than younger youth (age 15-19) (aOR=0.35; p=0.000 for female youth and aOR=0.36; p=0.000 for male youth). More-educated male youth were less likely to abstain (aOR=0.49; p=0.000 for secondary or higher education), but more-educated female youth were more likely to abstain (aOR=1.22; p=0.031). Both never-married female and male in-school youth were 4-5 times more likely to abstain from sex than never-married working youth (aOR=4.12; p=0.000 for female youth and aOR=4.83; p=0.000 for male youth). Not-in-school female youth were about as likely to abstain from sex as working female youth, but not-in-school male youth were about 2 times more likely to abstain from sex than working male youth. Muslim youth were much more likely to abstain than other youth (aOR=3.49; p=0.000 for primary abstinence among female youth and aOR=1.82; p=0.044 for primary abstinence among male youth). Luo youth (both female and male), mostly living in the Nyanza province, were less likely to abstain from sex, consistent with higher HIV prevalence among Luos.

As in the case of primary abstinence, prevention knowledge about abstinence was associated with increased likelihood of practicing secondary abstinence for both female and male youth (aOR=1.62; p=0.026 for female youth and aOR=1.55; p=0.104 for male youth). Prevention knowledge about condom use was associated with lower likelihood of secondary abstinence practice (aOR=0.72; p=0.001 for female youth and aOR=0.66; p=0.008 for male youth). Knowing someone who had HIV or someone who had died of AIDS was associated with lower likelihood of secondary abstinence practice for male youth (aOR=0.67; p=0.031), but not for female youth.

The survey year was significantly positively associated with the likelihood of secondary abstinence practice for both female (aOR=1.65, p=0.004 for 1998 and aOR=2.32, p=0.000 for 2003) and male youth (aOR=3.90, p=0.000 for 2003). However, none of the community-level factors or the interactions with time had any significant associations with the likelihood of secondary abstinence practice for either female or male youth.

Among sexually experienced never-married youth, with other factors controlled, older female youth (age 20-24) were more likely to have abstained from sex in the past year than younger female youth (age 15-19). This relationship between age and secondary abstinence was not observed for male youth. Working male youth were significantly less likely to have abstained in the past year than male youth who were not working. Among the not-working youth, in-school male youth were more likely to have abstained in the past year than out-of-school male youth. There was no association between work/schooling status and secondary abstinence for female youth.

Table 4: Logistic regression models of primary and secondary abstinence prevalence among never married female youth in Kenya, 1993-2003

Explanatory variables	Primary			Secondary		
	aOR†	Robust Std. Err.	p	aOR†	Robust Std. Err.	p
<i>HIV prevention knowledge</i>						
Abstinence belief (ref=No)						
Yes	1.32	0.20	0.070	1.62	0.35	0.026
Condom use belief (ref=No)						
Yes	0.37	0.03	<0.001	0.72	0.07	0.001
Knowing someone with HIV (ref=No)						
Yes	0.75	0.06	<0.001	1.06	0.11	0.575
<i>Mass media exposure</i>						
Weekly TV exposure						
Yes	1.20	0.11	0.046	0.87	0.11	0.243
Year (ref=1993)						
1998	1.40	0.17	0.005	1.65	0.29	0.004
2003	1.38	0.22	0.041	2.32	0.42	<0.001
Interaction terms						
Abstinence knowledge*1998	1.37	0.27	0.113	0.62	0.18	0.097
Abstinence knowledge*2003	1.70	0.36	0.011	0.92	0.26	0.760
<i>Contextual variables</i>						
Knowing someone with HIV (ref=Low: 0-0.49)						
Median : 0.5-0.74	0.79	0.09	0.032	0.80	0.13	0.156
High : 0.75 +	0.77	0.11	0.064	0.94	0.17	0.752
Community education (ref=Low: 0-0.74)						
Median : 0.75-0.89	1.14	0.17	0.382	1.30	0.26	0.187
High : 0.90 +	1.31	0.20	0.082	1.34	0.27	0.138
Households with a radio or TV (ref=Low: 0-0.69)						
Median : 0.70-0.89	0.87	0.08	0.145	0.95	0.12	0.703
High : 0.90 +	1.40	0.18	0.007	0.71	0.12	0.037
<i>Individual background</i>						
Age (ref=15-19)						
20-24	0.35	0.03	<0.001	1.31	0.15	0.017
Education (ref=Illiterate)						
Primary complete	0.80	0.08	0.020	1.00	0.13	0.981
Secondary +	1.22	0.11	0.031	1.07	0.14	0.610
Work and schooling status (ref=working)						
Not Working but in school	4.12	0.40	<0.001	0.88	0.14	0.422
Not Working not in school	0.95	0.083	0.597	1.11	0.13	0.374
Residence (ref=urban)						
Rural	1.14	0.13	0.269	0.99	0.16	0.938
Province (ref=Nairobi)						
Central	0.94	0.19	0.767	1.08	0.27	0.752
Coast	2.18	0.45	<0.001	0.44	0.12	0.003
Eastern	0.72	0.16	0.124	0.79	0.20	0.354
Nyanza	0.57	0.12	0.009	0.74	0.21	0.295
Rift Valley	1.25	0.23	0.238	1.38	0.32	0.166
Western	1.21	0.28	0.422	0.91	0.26	0.735
Religion (ref=Roman)						
Protestant	1.17	0.09	0.043	1.21	0.13	0.085
Muslim	3.49	0.85	<0.001	0.95	0.43	0.918
No religion & Others	1.22	0.47	0.604	1.72	0.91	0.305
Race (ref=Kikuyu)						
Kalenjin	0.82	0.14	0.237	0.72	0.18	0.196
Lamba	0.96	0.21	0.843	1.50	0.35	0.086
Luhya	0.81	0.14	0.234	1.13	0.29	0.625
Luo	0.58	0.11	0.004	1.04	0.28	0.870
Others	1.13	0.21	0.493	1.48	0.32	0.071
Model statistics						
Wald χ^2 (df)	1,011.19 (34)		p<0.001	141.02 (34)		p<0.001
Pseudo-R ²	0.2230			0.0478		
aOR† (adjusted odds ratio) was estimated to adjust for clustering of households in the same census track.						

Table 5: Logistic regression models of primary and secondary abstinence prevalence among never married male youth in Kenya, 1998-2003

Explanatory variables	Primary			Secondary		
	aOR†	Robust Std. Err.	p	aOR†	Robust Std. Err.	p
<i>HIV prevention knowledge</i>						
Abstinence belief (ref=No)						
Yes	2.35	0.40	<0.001	1.55	0.42	0.104
Condom use belief (ref=No)						
Yes	0.41	0.05	<0.001	0.66	0.10	0.008
Knowing someone with HIV (ref=No)						
Yes	0.60	0.07	<0.001	0.67	0.12	0.031
<i>Mass media exposure</i>						
Weekly TV exposure						
Yes	0.60	0.07	<0.001	0.88	0.13	0.398
Year (ref=1998)						
2003	0.99	0.15	0.924	3.90	0.88	<0.001
Interaction terms						
Abstinence knowledge*2003	0.81	0.18	0.331	0.82	0.27	0.554
<i>Contextual variables</i>						
Knowing someone with HIV (ref=Low: 0-0.49)						
Median : 0.5-0.74	0.69	0.16	0.113	0.78	0.22	0.383
Community education (ref=Low: 0-0.74)						
Median : 0.75-0.89	1.27	0.35	0.381	1.03	0.34	0.938
High : 0.90 +	0.86	0.24	0.590	0.90	0.28	0.743
Households with a radio or TV (ref=Low: 0-0.69)						
Median : 0.70-0.89	1.16	0.18	0.351	1.29	0.25	0.196
High : 0.90 +	1.38	0.22	0.045	1.16	0.25	0.477
<i>Individual background</i>						
Age (ref=15-19)						
20-24	0.36	0.05	<0.001	0.85	0.13	0.295
Education (ref=Illiterate)						
Primary complete	0.71	0.12	0.038	1.22	0.24	0.319
Secondary +	0.49	0.07	<0.001	1.12	0.19	0.522
Work and schooling status (ref=working)						
Not Working but in school	4.83	0.78	<0.001	2.49	0.51	<0.001
Not Working not in school	1.98	0.36	<0.001	1.80	0.32	0.001
Residence (ref=urban)						
Rural	0.61	0.12	0.013	0.81	0.21	0.418
Province (ref=Nairobi)						
Central	2.47	0.83	0.007	0.83	0.33	0.639
Coast	0.89	0.32	0.741	0.50	0.21	0.096
Eastern	0.99	0.38	0.973	1.26	0.56	0.613
Nyanza	0.85	0.31	0.656	0.48	0.19	0.067
Rift Valley	0.70	0.22	0.262	0.41	0.16	0.024
Western	2.05	0.71	0.038	0.72	0.32	0.471
Religion (ref=Roman)						
Protestant	1.18	0.16	0.224	1.28	0.23	0.157
Muslim	1.82	0.54	0.044	0.83	0.36	0.660
No religion & Others	0.98	0.25	0.944	0.68	0.26	0.312
Race (ref=Kikuyu)						
Kalenjin	0.65	0.21	0.179	1.24	0.43	0.538
Lamba	0.92	0.33	0.819	0.58	0.27	0.247
Luhya	0.85	0.27	0.616	0.71	0.27	0.364
Luo	0.88	0.29	0.689	0.76	0.28	0.462
Others	1.02	0.30	0.954	0.73	0.25	0.368
Model statistics						
Wald χ^2 (df)	519.56 (32)		p<0.001	156.38 (32)		p<0.001
Pseudo-R ²	0.2633			0.1277		

DISCUSSION

Our analysis indicates that abstinence levels were higher among female youth than among male youth in Kenya. For female youth, both primary and secondary abstinence levels have risen in the past 10 years. For male youth in the past 5 years, the increase in the primary abstinence level was rather small, but the increase in the secondary abstinence level was substantial, possibly as a result of government efforts at promoting abstinence among youth in the past few years.

As expected, increased knowledge that abstinence can prevent HIV infection seems to have contributed some to the increased practice of abstinence among both female and male youth. However, knowledge that condom use can prevent HIV infection was associated with lower likelihood of abstinence practice (both primary and secondary). One possible explanation for this association is reverse causality from having sex and using a condom to prevention knowledge about condoms.

In-school female and male youth were much more likely to have abstained from sex than out-of-school and working youth. The finding that attending school promotes abstinence is consistent with evidence from other countries (WHO, 2002). The study also found significant influences of religion and ethnicity on the likelihood of practicing primary abstinence. However, effects of household socioeconomic status and urban/rural residence were small and inconsistent. Effects of contextual factors were also generally small and insignificant, except for primary abstinence among female youth. There were some important sex differences in associations with media exposure and educational status of youth. Female youth with weekly exposure to television and those with a secondary or higher education were significantly more likely to have abstained from sex, whereas male youth were significantly less likely.

Several measurement constraints must be kept in mind when interpreting these findings. First, we lack longitudinal data on abstinence and associated factors in Kenya. Instead, our analysis of trends is based on three cross-sectional surveys with independently drawn samples, which makes assessing causal determinants of trends in abstinence difficult. We attempt to address this by pooling data from different surveys and by interacting the time variable with other key variables of interest. Second, our analysis is based on reported information on sexual behavior. Our results may be biased to the extent there is misreporting of sexual behaviors by youth (Mensch et al., 2003). In a given social context, the extent of such misreporting could vary by sex, educational level, economic status, and area of residence (Hewitt et al., 2004). Another limitation is that the surveys did not collect information on some key factors such as parental involvement, peer pressure, social networks, and school environment, that are known to influence youth sexual activity. However, our controls for a number of socioeconomic and contextual factors may partially account for these missing factors.

In sum, our analysis provides information regarding levels and trends in primary and secondary abstinence among never-married youth in Kenya. The study also provides new information about influences of knowledge of prevention methods, schooling, and other socioeconomic and contextual factors on the likelihood of practicing abstinence. We found increasing levels of abstinence knowledge and practice among both female and male youth. Our finding of a positive association between knowledge that abstaining from sex can prevent HIV infection and abstinence practice suggests the need to strengthen programs to promote knowledge of abstinence among youth. Also, our finding that in-school youth were several times more likely to have practiced abstinence indicates the need to strengthen education programs to keep youth in schools. Major differences in abstinence practice by religion and ethnicity and sex differentials in the effects of education and media exposure suggest the need for abstinence programs to be gender sensitive and culturally appropriate.

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