

Looking for Change in Response to the AIDS Epidemic: Trends in AIDS Knowledge and Sexual Behavior in Zambia, 1990 Through 1998

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Summary: This study investigates trends in AIDS knowledge and sexual behavior among men and women in urban Lusaka 1990 to 1998, and in all of Zambia, 1992 to 1998. Using data from representative surveys of urban Lusaka and of the country as a whole, population proportions were estimated to examine trends in knowledge and sexual risk behaviors. Differences in the estimated proportions between 1990 and 1998 were tested in Lusaka. In all Zambia, tests of difference were conducted between the earliest and latest years for which data were available for each indicator. A decline in premarital sexual activity was observed in urban Lusaka. In 1990, 50% of never married women reported no sexual experience, compared with 60% in 1998 ($p = .003$); among men, the figures were 38% and 53%, respectively ($p < .001$). Fewer women (1990, 8%; 1998, 2%; $p < .001$) and men (1990, 31%; 1998, 19%; $p = .07$) had extramarital partners. The bulk of change observed in urban Lusaka took place from 1990 to 1996; the changes in men's behavior observed between 1996 and 1998 were also observed in the national estimates for those years. National figures for other indicators from 1992 to 1998 were less encouraging. Apart from an increase in having ever used condoms, no change in women's sexual behavior was observed. Fewer men had premarital sex from 1996 to 1998 (1996, 64%; 1998, 46%; $p < .001$), but condom use with nonregular partners decreased among men (1996, 38%; 1998, 29%; $p = .02$). Prevention campaigns focused on education about AIDS and promoting safer sexual behavior appear to have made a difference in the early 1990s in Zambia. Findings from more recent years indicate that further change has stagnated. Renewed efforts are needed, particularly targeting condom use with nonregular partners. **Key Words:** Zambia—AIDS—Sexual behavior—Condom use—Africa.

Since the onset of the AIDS pandemic, many countries have established national AIDS programs. HIV prevention efforts aiming at promoting safer sexual behavior have taken a central place in these programs. Examining patterns of individual knowledge and behavior over time

is critical to understand the response to the AIDS epidemic at the population level and the need for future interventions aimed at prevention. Results from some countries with data that allow for assessment of trends in sexual behavior have shown some positive trends over time. In Thailand, national surveys in 1990 and 1993 showed a rapid increase in AIDS knowledge, a decline in visits to female commercial sex workers, and an increase in self-reported condom use with commercial sex workers (1). Four national surveys in Jamaica suggest an in-

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crease in condom use over time (2). Data from a national knowledge, attitudes, beliefs, and practices (KABP) survey and two national demographic and health surveys (DHS) in Tanzania point to modest changes in sexual behavior (3–5), which was corroborated by findings from a cohort study (6). In most countries, data on trends in AIDS knowledge and sexual behavior are limited to smaller populations. For example, the main evidence of changes in sexual behavior in Uganda is based on survey data from two urban areas (7). In Senegal, data from urban areas and a small rural cohort study suggest positive changes in knowledge and sexual behavior (8,9). This study presents a trends analysis of urban Lusaka, Zambia based on representative surveys conducted there in 1990, 1992, 1996, and 1998, and of all Zambia based on three nationally representative surveys conducted in 1992, 1996, and 1998.

Zambia is one of the countries more severely affected by the AIDS epidemic, with national HIV prevalence among antenatal women estimated at between 25% and 32% in urban areas, and 8% and 16% in rural areas in 1994 (10). By the middle 1990s, general awareness about AIDS was almost universal in the most affected countries of Africa, with most of the population having some further knowledge about HIV infection (4,11–13). Interventions at both the national and local levels have focused on promoting safer sexual behavior throughout the 1990s; some have specifically targeted adolescents. In this context, these data present an opportunity to assess trends in sexual behavior there during the 1990s, through a decade of HIV prevention efforts and when AIDS morbidity and mortality are likely to have become more visible to the general population.

METHODS

Zambia had a total population of 7.8 million at the last census in 1990, with an annual growth rate of 2.7%. About 40% of Zambians live in urban areas, but this proportion varies considerably by province. Lusaka's urban population was over 1 million in 1990. Data from cross-sectional surveys are used in the analyses focusing on trends in knowledge and behavior for urban Lusaka and for Zambia as a whole: the 1990 Lusaka World Health Organization's (WHO) Global program on AIDS KABP survey (5), the 1992 Zambia DHS (1992 ZDHS) (14), the 1996 ZDHS (13), and the 1998 Zambia Sexual Behavior Survey (15).

The 1990 survey was one of 12 KABP studies supported by the WHO's Global program on AIDS, which focused on AIDS knowledge and sexual behavior. A representative sample of men and women aged between 15 and 49 years living in urban Lusaka was drawn, using a two-stage probability sampling strategy (5). The data from 1992, 1996, and 1998 are from the three nationally representative surveys that were designed to produce reliable estimates for Zambia as a whole, and for urban and rural areas, separately. The 1992 ZDHS collected a range of

information on fertility, maternal, and child health, and AIDS knowledge from women of reproductive age. The 1996 Zambia DHS (1996 ZDHS) added questions on sexual behavior and interviewed men as well as women. The sampling frame for the ZDHS surveys was developed from the 1990 Zambian census that divided the country into about 4200 census supervisory areas (CSAs); 312 CSAs were selected for the ZDHS using probability proportional to size methods. The household lists for the CSAs were updated to reflect the change in the number of households per standard enumeration area from 1990 to 1992 and 1996. Households were selected using a three-phase procedure, with each province stratified by urban and rural areas. All women in selected households between the ages of 15 and 49 years were eligible for interview in both survey years. In 1996, all men aged between 15 and 59 years in a quarter of these households were eligible. The overall response rate for the 1992 survey was 97.4%. In 1996, the response rate for women was 96.1% and for men 90.5%. In both surveys, the less populated provinces of the country were oversampled to ensure the minimum sample size needed for analysis in these areas. Due to this nonproportional sampling distribution, sampling weights were required for the national study to ensure that the resulting estimates were representative of Zambia as a whole. More detail about the sampling procedures and survey design can be found elsewhere (13,14).

The Zambia Sexual Behavior Survey (ZSBS) took place in 1998 with the objective of obtaining national estimates of key indicators of HIV/STD prevention, including knowledge, attitudes, and sexual behavior. The ZSBS used the sampling frame developed for the 1996 ZDHS and randomly selected 80 of the 312 original CSAs. The household lists for these selected CSAs were updated for the ZSBS. All individuals aged 15 to 49 years were eligible for interview. The response rates were similar to those of the 1996 ZDHS, with 95% of eligible women and 92% of eligible men being successfully interviewed. The survey and sampling procedures are explained in greater detail elsewhere (15).

The type of information collected on AIDS knowledge and sexual behavior was similar for all four surveys. In the case of AIDS knowledge questions, analyses were limited those questions that were similarly worded across all surveys. The choice of indicators for the present analyses was guided by the availability of information from all surveys that enabled identical variables to be constructed and compared. The wording of the survey questions is reflected in the wording used for the indicators in the tables.

Statistical Analyses

Due to the variation in AIDS knowledge and sexual behavior between women and men, analyses were stratified by gender. Given that the age criteria for three of the surveys was 15 to 49 years, the present study excluded individuals outside this age range in the 1996 ZDHS to enable comparability of the results. The sample weights developed for the 1992 and 1996 ZDHS were used to produce national estimates. For the 1998 ZSBS national estimates, weights were constructed to reflect the urban proportion of 15- to 49-year-old women and men in Zambia, based on the findings of the 1996 ZDHS, which were 44.9% for women and 46.7% for men, respectively (13). The Lusaka samples did not require the use of weighting to generalize back to the urban population of reproductive age there.

Descriptive statistics were used to explore the differences in the distributions of the Lusaka samples of women and men across age, education, and age at first union or marriage. Estimated population proportions of women and men are presented for the remaining indi-

cators. For the Lusaka samples, differences in the estimated proportions between 1990 and 1998 were tested separately for women and men, using a two-tailed z-test of significance (16). The same procedure was used on the national samples, testing for change between 1992 and 1998 for women and 1996 and 1998 for men. Intracluster correlation caused by the design effect of all surveys was controlled for in the tests of difference by obtaining robust estimates of variance for the population proportions, using the survey command options in *Stata*, version 6.0 (17). *SAS*, version 6.12 (18) was also used in statistical analyses.

RESULTS

Background Characteristics of the Lusaka Samples, 1990 through 1998

The age and educational status of women and men in the samples from 1990 to 1998 are shown in Table 1. Small differences were observed for both women and men. A larger proportion of women in the 1990 sample had completed secondary school compared with the remaining three samples. The mean age at marriage in urban Lusaka (not shown) increased for men, from 21.4 years in 1990 to 23.2 years in 1998, but remained stable for women, at 18.2 years in 1990 and 18.4 years in 1998.

Knowledge and Sexual Behavior in Lusaka, 1990 through 1998

Trends in knowledge and behavior among urban residents of Lusaka from 1990 to 1998 are shown in Table 2. Awareness of AIDS was already universal in Lusaka in the early 1990s, but some change in further knowledge took place over the next 8 years. There was a decrease in the proportion of women and men who knew that AIDS could be avoided from 1996 to 1998. Increasing proportions of both women and men knew that an HIV-infected person could be appear healthy. There was a marked

change from 1990, when 64% of women and 68% of men responded correctly, to 1998 when the figures were 93% and 95%, respectively ($p < .001$ for both genders). Positive changes were also observed for sexual behavior. Three indicators of sexual abstinence show reductions in sexual activity over time for both men and women. Significantly more women and men in 1998 reported no sex during the last month compared with findings in 1990. Even more pronounced change occurred in premarital sexual activity. For instance, among men who had never married, 35% reported no sex during the last year in 1990, compared with 68% in 1998 ($p < .001$). Most changes in sexual behavior observed for women took place between 1990 and 1996, but trends in men's high-risk behavior continued to decline through 1998. Multiple partnerships were much more commonly reported by men than by women in all surveys. The proportion of men reporting multiple partnerships decreased between 1990 and 1998 for all three indicators, with statistically significant decreases seen for those reporting four or more partners ($p = .009$) and extramarital partners ($p = .03$).

Trends in Knowledge in Zambia, 1992 through 1998

Results for the national study examining change between 1992 and 1998 show that more recent trends are less encouraging, particularly among women. Table 3 presents the trends in knowledge about AIDS and condoms. Among women who had heard of AIDS, 63% said that infection could be avoided in 1992, compared with 84% in 1996, with a significant decline to 80% in 1998 ($p = .02$). Among men, the decrease between 1996 and 1998 was slightly greater, with 95% and 88%, respectively ($p < .001$). Over 99% of respondents who said AIDS could be avoided in both 1996 and 1998 men-

TABLE 1. Sociodemographic characteristics of women and men in urban Lusaka, by year, 1990–1998

	Women				Men		
	1990	1992	1996	1998	1990	1996	1998
Total sample size (n)	1020	1042	943	259	972	181	185
Age (%)							
15–19 y	28	27	25	30	14	19	20
20–29 y	47	39	41	38	27	45	39
30–39 y	18	23	22	22	36	23	29
≥40 y	7	11	12	10	23	13	12
Level of school completed (%)							
None	11	9	7	9	6	3	3
Primary	38	51	45	49	29	35	30
Secondary	47	35	40	35	57	48	52
Higher	4	5	8	7	8	14	15

TABLE 2. Comparison of knowledge and sexual behavior among women and men in urban Lusaka, 1990–1998

	Population included	Gender	Percentage of individuals			
			1990	1992	1996	1998
Knowledge about AIDS						
Has heard about AIDS	All	Women	98	99	100	100
		Men	99	—	100	100
Knows AIDS can be avoided	Heard about AIDS	Women	87	71	91	81 ^a
		Men	90	—	99	92
Knows HIV-infected person can appear healthy	Heard about AIDS	Women	64	89	93	93 ^b
		Men	68	—	94	95 ^b
Sexual abstinence						
Never had sex	All	Women	13	13	15	18
		Men	8	—	13	14 ^a
No sex in past month	All	Women	34	57	51	50 ^b
		Men	35	—	38	46 ^a
No premarital sex in past year	Never married	Women	48	54	65	68 ^c
		Men	35	—	35	68 ^b
Multiple partners						
Two or more nonregular partners in past year ^d	All	Women	3	—	3	4
		Men	21	—	17	15
Four or more nonregular partners in past year ^d	All men	Men	9	—	7	4 ^c
Sex with person other than spouse in past year	Currently in union	Women	8	—	1	2 ^b
		Men	33	—	13	19 ^a

^a $p < .05$.^b $p < .001$.^c $p < .01$.^d Nonregular partners were those with whom an individual had sex, who were not either married to or living with the respondent at the time of interview.

tioned at least one way that pertained to safer sexual practices (not shown), including condom use, having fewer partners, and avoiding casual sex. There was a slight increase in the proportions of women over the 2-year period who knew that a person infected with HIV could appear healthy and slightly more women and men knew someone who was infected with HIV or who had died of AIDS. Although fewer than three quarters of women had heard of condoms in 1992, nearly all knew about them by 1996 (94%). By 1996, most men had heard of condoms as well (97%), with little change observed for either gender in 1998. About three quarters of women reported that they knew where to obtain condoms in 1996 and 1998, but a larger proportion of women reported knowing a source in 1992. Among men, there was a small but statistically significant increase from the 86% who knew a source for condoms in 1996 to the 90% in 1998 ($p = .01$).

Trends in Sexual Behavior in Zambia, 1996 through 1998

Very little change was seen among women from 1992 to 1998 in any of the sexual behavior indicators (Table 4), but significant differences were observed among men between 1996 and 1998. The number of men reporting no sex for the past month and unmarried men reporting

TABLE 3. Proportion of individuals with knowledge pertaining to AIDS and condoms, Zambia, 1992–1998

	1992	1996	1998
Total sample size (n)			
Women	7060	8021	2040
Men	—	1727	1655
Has heard of AIDS (%)			
Women	99	100	99
Men	—	100	99
Knows AIDS can be avoided (%) ^a			
Women	63	84	80 ^b
Men	—	95	88 ^d
Knows HIV-infected person can appear healthy (%) ^a			
Women	75	82	84
Men	—	88	88
Knows person infected with HIV or one who has died of AIDS (%) ^a			
Women	—	67	73 ^c
Men	—	69	72
Has heard of condoms (%)			
Women	72	94	92
Men	—	97	97
Knows where to get condoms (%)			
Women	85	75	76
Men	—	86	90 ^b

^a Includes only those individuals who have heard of AIDS, with the following sample sizes.^b $p < .05$.^c $p < .001$ for differences between 1996 and 1998.

TABLE 4. Comparison of reported recent sexual behavior, Zambia, 1992–1998

	Population included	Gender	Percentage of individuals		
			1992	1996	1998
Sexual abstinence					
Never sexually active	All	Women	12	12	12
		Men	—	12	12
Not sexually active in last month	All	Women	55	48	46
		Men	—	38	42 ^a
No premarital sex within last year	Never married	Women	58	60	60
		Men	—	36	53 ^b
Multiple partnerships					
Two or more nonregular partners in last year ^c	All	Women	—	3	3 ^d
		Men	—	21	15
Four or more nonregular partners during last year ^c	All men	Women	—	7	5 ^a
		Men	—	—	—
Sex with person other than regular partner past year	Currently in union	Women	—	1	2
		Men	—	21	20
Condom use					
Ever used condoms	All	Women	9	22	21
		Men	—	45	42
Used condoms with nonregular partner at last intercourse	All with nonregular partners	Women	—	21	19
		Men	—	38	29 ^d

^a $p < .10$.^b $p < .001$, for differences between 1996 and 1998.^c Nonregular partners were those with whom an individual had sex, who were not either married to or living with the respondent at the time of interview.^d $p < .01$.

no sex in the past year increased during the 2-year period. There was very little change in the median age at first marriage in Zambia between 1996 and 1998. Information on women's sexual behavior with nonregular partners was not available for 1992. Overall, few women reported sexual activity with nonregular partners during the last year in both 1996 and 1998 with very little change occurring between the 2 years. Among women currently in a regular union, 1% reported having sex with someone other than their spouse/regular partner in 1996, compared with 2% in 1998. Fewer men in Zambia reported multiple partners in 1998. In 1996, 21% of men reported having 2 or more partners during the last year, compared with 15% in 1998 ($p = .002$); the proportions who reported 4 or more partners were 7% and 5%, respectively ($p = .05$). Little difference was observed in the proportions of men currently in union who had sex with at least 1 other person other than their spouse during the last year.

The last two indicators in Table 4 pertain to condom use. Only 9% of women reported ever having used a condom in 1992; this more than doubled in 1996, but there was almost no change between 1996 and 1998. Among women with nonregular partners during the last year, 22% reported using a condom the last time they had

sex with such a partner in 1996, and 21% reported condom use in 1998. Among men with nonregular partners during the last year, there was a notable decrease in the proportion who used a condom at last sex. In 1996, 38% of men reported condom use at last sex with a nonregular partner, compared with 29% in 1998 ($p = .003$).

Figure 1 depicts the patterns of sexual activity among adolescents, showing the proportion of 15 to 20 year olds who had ever had sex at the time of interview for the national samples, by single year of age. Fewer adolescent girls than boys had sexual intercourse at the younger ages for all 3 years; the percentage of girls and boys are much closer above age 17 years. Among girls, there was very little change in the pattern of sexual activity; the patterns are almost identical except at age 16 years, when notably fewer girls had ever had sex in 1998 (39%) than in 1996 and 1992 (45% and 46%, respectively). Fewer boys reported having sex in 1998 compared with 1996 for all ages except 15 and 18 years. The largest changes were observed for those 16 and 17 years of age, with differences of 5% and 12% between the 2 survey years at these ages, respectively. None of these differences was statistically significant, probably due to the small numbers of individuals in each age group. There appears to be a slight downward trend among boys who had ever



FIG. 1. Proportion of adolescent men and women in Zambia who have ever had sex, by age at the time of each survey.



had sex. However, this may reflect a change in recent sexual activity between the two surveys rather than to a delay in the onset of sexual activity, given that similar decreases were observed for sexual abstinence among men between 1996 and 1998 (Table 3).

To explore whether changes in knowledge and behav-

ior were taking place disproportionately in urban versus rural areas in the national samples between 1996 and 1998, analyses were stratified by residence (data not shown). Trends for both women and men were generally similar for both types of areas. The major difference between the urban and rural samples observed was in the

proportion of single men reporting no premarital sex in the last year, in which the increase was more marked in urban areas. In 1996, 36% of urban men reported no premarital sex, compared with 58% in 1998 ($p < .001$). The corresponding figures for rural men were 36% and 47%, respectively ($p = .04$). The decline in condom use at last sex with a nonregular partner was also greater in urban areas. Among urban men with a nonregular partner, 48% reported that they used a condom in 1996 compared with 35% in 1998. Among rural men, the proportions were 27% and 24% in 1996 and 1998, respectively.

DISCUSSION

Four surveys in Lusaka strongly suggest positive changes have taken place in AIDS-related knowledge and high-risk sexual behavior patterns among women and men. The bulk of this change took place in the early 1990s. A similar picture emerges for Zambia as a whole, although there are fewer data to describe trends in the early 1990s than in Lusaka. Results documenting trends from 1996 to 1998 do not indicate that much further change in knowledge and sexual behavior took place during this period, even in exclusively urban areas. Although some evidence suggests less premarital sexual activity and a decline in the proportion of multiple sexual partners among men in recent years, there is virtually no evidence of changes in women's sexual behavior. Further, there is a marked decline in men's use of condoms with nonregular partners.

The findings should be interpreted in the light of potential biases. Several authors have questioned the validity and reliability of self-reported sexual behavior (19–21). In line with findings from many other studies (5), both surveys in Zambia found much lower levels of multiple partnerships and condom use among women compared with men. This may be due to genuine differences, underreporting of nonmarital sexual behavior by women, overreporting by men, or both. A striking finding of this study, however, is the high level of consistency that was found for most indicators in the national study between 1996 and 1998. If indeed no real changes have taken place during this period, this implies high levels of reliability of the sexual behavior measures. This occurs despite possibly increased social desirability biases, which could cause more respondents to report safer sexual behaviors because they are promoted as part of HIV prevention activities in the country. Differences in survey contexts and questionnaire designs may also have affected the results. The 1992 and 1996 ZDHS interviews focused on family planning and, for women, maternal and child health issues; the questions on sexual behavior

were only posed in the second half of the interview when more than 30 to 45 minutes passed. In the 1990 KABP and 1998 ZSBS, sexual behavior is addressed after a short introductory section and about 10 to 15 minutes of interviewing. In general, however, the results appear very consistent.

The comparison of knowledge levels was limited by differences in the way other questions were worded across the four surveys. Because awareness about AIDS was universal and levels of further knowledge were fairly high by 1990, we might not expect to see notable changes after only 2 more years. It is disconcerting, however, that the proportion of respondents who said AIDS can be avoided decreased during 1996 to 1998. This finding could be interpreted in the context of increasing visibility of morbidity and mortality associated with HIV. There appears to be a growing awareness of the worsening situation in Zambia, because more individuals have been personally affected by the epidemic, as also indicated by the larger numbers of women and men who knew someone who was infected with HIV or had died of AIDS between 1996 and 1998, which has increased notably from the early 1990s. The 1990 KABP showed that 56.5% knew someone with AIDS at that time in Lusaka (22). Even if knowledge levels are high, there is a pressing need for continuing quality education of the general public, because many people may lose faith in the possibility of prevention if increasing numbers of their communities are affected by AIDS. Also of concern were the 10% of men and 20% of women in 1998 who did not know where condoms could be obtained. Programmatic activities need to continue emphasizing that preventing infection is attainable, as well as exploring ways of influencing behavior change to safer sexual practices in the long term.

In Zambia as a whole, there were no changes in the age at first sex or adolescent condom use between 1992, 1996, and 1998, but a decrease in premarital sexual activity was observed for both women and men in Lusaka from 1990 to 1998 and for men in the whole country from 1996 to 1998. These declines could not be explained by earlier age at marriage and appear to concur with other studies in Africa that have first observed changes in sexual behavior among adolescents. For example, in Uganda, a rapid increase in the age at first sex and condom use was reported (7). The stagnant trends for adolescent women observed during the later period may, in part, be related to the age difference between sexual partners, because male partners are generally older. In 1998, the median age difference was 3.7 years (15). Previous studies in Zambia have also shown that adolescent sexual activity was high (23), even though students often

disapprove of premarital sex when asked in a survey (24,25).

Condom use could not be evaluated in the Lusaka study due to the lack of comparable data, but national trends from 1996 to 1998 indicate a decline in condom use in nonregular sexual partnerships by men. Part of this may be explained by changes in the nature of sexual partnerships, most notably, a reduction in casual sexual encounters. Condom use often declines with the duration of a partnership and a decrease in the frequency of casual sexual encounters. Trends in the duration of partnerships could not be assessed because they were not asked in the DHS interviews. The 1998 ZSBS found that 12% of the 973 nonregular partnerships reported in the last year by men lasted only one day (15). Another possibility may be found in the type of men engaging in multiple partnerships. Because the proportion of men with multiple partners declined, the remaining men with multiple partners may be less risk averse than those who have limited these partnerships, and are therefore less likely to use condoms. In general, condom use is very low in Zambia, with only one fifth of women at both times reporting ever using one. In-depth anthropologic work has revealed numerous cultural barriers to the use of condoms. In Chiawa, a rural area in Lusaka province, these included stigmas due to their association with disease and infidelity, and perceptions of what constituted a satisfying sexual encounter (26). It is also possible that condom accessibility declined, although a higher proportion of respondents in 1998 reported that they knew a source of condoms, compared with 1996.

The Lusaka study documented significant change over an 8-year period. The emphasis of the national study was based on only 2 years of time, which may be too short a period in which to expect major changes in knowledge and sexual behavior. Even so, there have been several studies—such as in Thailand between 1990 and 1993 (1), the rural Senegal study from 1992 to 1994 (9), urban Tanzania (6), and urban Uganda 1990 to 1995 (7)—that have documented major changes over relatively short periods of time. The most important issue in the present study is the positive change through the early 1990s, and then an apparent lack thereof in recent years, even in urban areas alone. Although AIDS prevention campaigns have made a difference in Zambia, this study shows that there is no foundation for complacency. Rather, there is a need for renewed efforts, particularly focusing on the use of condoms with nonregular partners.

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