

**Title:** Prevalence and correlates of concurrent sexual partnerships among young people in South Africa

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Short Summary: A study among young people in South Africa found a 13% prevalence of concurrent sexual partnerships. Concurrency was correlated with other risky sexual behaviors, race and partner fidelity.

Keywords: concurrent sexual partnerships; concurrency; sexual behaviors; HIV; South Africa

Concurrency or overlapping sexual partnerships is a critical element of partnership dynamics that plays an important role in HIV transmission.<sup>1-5</sup> In South Africa, numerous qualitative and quantitative studies have found a high prevalence of concurrency as well as documented social and cultural norms that enable or condone such partnerships.<sup>6-8</sup> In South Africa, young people remain at high risk for HIV infection. In 2008, 5.1% of young men and 21.1% of young women, aged 20-24 were estimated to be infected with HIV.<sup>9</sup> In 2008, 30% of young men, age 15-24 reported more than one partner in the past twelve months, an increase from 23% in 2002.<sup>9</sup> Few studies have explicitly examined factors associated with concurrency in South Africa. It is critically important to understand these factors to ensure that HIV prevention interventions that address concurrency are appropriately targeted and grounded in evidence. This study examines the prevalence and factors that are associated with concurrency among a population in South Africa to inform the evidence base.

The analysis utilizes data from the Cape Area Panel Study, a representative sample of 3,536 young people, aged 16-26 living in the Cape Metropolitan Area (CMA), South Africa in 2005. Details of the survey and sampling have been previously published.<sup>10</sup> This analysis is restricted to 2,127 sexually active young adults, defined as having ever engaged in full penetrative sex. The study received ethical approval from the University of Cape Town and the Harvard School of Public Health. A stepwise backward elimination model building process using survey (svy) methodology was conducted in Stata 9.0 (College Station, TX). The outcome of interest was reporting having “had sex with a concurrent partner while in the most recent sexual partnership”.

The sampled youth were nearly evenly divided by sex and represented three racial groups (identified using South African census terminology) in proportions that reflect the unique racial

composition of Western Cape: Black African – 37.1%, Coloured – 49.3%, and White – 13.6%. The ages of the respondents ranged from 16 to 26 years, with a mean age of 21 years. The mean age of sexual debut was 16.7 years. The mean number of lifetime sexual partners was 2.2 partners. (See Table 1.) Overall, 12.8% of youth reported a concurrent partnership during their last sexual partnership. This masks significant differences in reporting between men and women, (20.4% and 6.2%, respectively). Black respondents were significantly more likely than Coloureds or Whites to report concurrency – 21.8% versus 8.6% and 2.9% respectively.

The final regression results are presented in Table 2. Young women were significantly less likely to report concurrency, compared to young men, after adjusting for other factors ( $P < 0.01$ ). Time since sexual debut was significant for individuals who were sexually active for 5-6 or 7+ years ( $P = 0.01$ ,  $P < 0.01$ , respectively) compared to those who debuted 0-2 years ago. Individuals who reported having five or more lifetime sexual partners were significantly more likely to report concurrency compared to those with 1-3 lifetime sexual partners ( $P < 0.01$ ). The strongest positive correlate of concurrency was knowledge that a partner had a concurrent partner (adj. OR = 5.52,  $P < 0.01$ ). Self-assessed HIV risk, personal income, religion, and age gap, co-residence and condom use with the most recent partner did not achieve significance in earlier models (data not presented) to warrant inclusion in the final model. Post-estimation statistics indicate that the model was a good fit to the data and the discriminative capacity of the model was strong. Various tests indicated that collinearity among variables was unlikely.

Overall, this study found varying levels of concurrency among different sub-populations of young adults in the Cape Metropolitan Area. Such varying levels of concurrency among different sub-populations could be one factor, among many including male circumcision and condom use, resulting in the heterogeneous spread and persistence of HIV among communities

in South Africa. Different levels of concurrency correlated with racial groups and STDs (i.e. gonorrhoea) have been observed in other populations<sup>11</sup> Race in South Africa may be one proxy for economic, cultural and social norms and patterns that govern sexual behaviors, assuming sexual mixing between races is homogeneous.<sup>12</sup>

That young men report more concurrency than young women is in agreement with other studies, as well as with similar research that indicate that young men report more sexual risk behaviors compared to young women.<sup>13, 14</sup> However, it is evident that a significant minority of women do have concurrent partners. This fact is critical for enabling the sustained transmission of HIV through sexual networks. The reported levels of concurrency found here among young men and women are likely large enough to enable a large and robust sexual network, similar to that described by others, though further modeling would be necessary to determine this.<sup>15</sup>

Previous research has demonstrated that some high risk sexual behaviors tend to occur in the same individuals.<sup>16</sup> I hypothesized that concurrency is another risk behavior that occurs in tandem with other behaviors that are known to be high risk, such as a large number of sexual partners and an early age of sexual debut. It is possible that social or cultural drivers of these behaviors may be similar. For instance, notions of masculinity and social and peer acceptance among young men may promote multiple girlfriends, concurrency and an earlier age of sexual debut.<sup>17-19</sup> The analysis found that concurrency was correlated with larger numbers of lifetime partners, among both Blacks and Coloureds. This correlation can partly be explained by the inclusion of individuals who have ever had only one lifetime partner, which may exaggerate the effect of having larger numbers of partners. However, among Blacks, the correlation was significantly evident only with five or more partners, indicating that the correlation would likely hold even if individuals with only one lifetime partner were excluded from the analysis. One

possible explanation is that as this young population acquires sexual partners, many do so concurrently rather than serially.

The correlation between concurrency and time since sexual debut indicate that a longer exposure time to possible concurrent partnerships and therefore an earlier age of sexual debut is correlated with concurrency. Overall concurrency does appear to occur alongside other higher risk sexual activities, namely an early age of sexual debut (as measured by time since sexual debut) and higher numbers of lifetime sex partners.

Qualitative research from southern Africa indicates that there is a strong association between concurrency and sexual partnerships, in general, and material or financial transactions.<sup>6, 20, 21</sup> The lack of an association in this study between income and concurrency could have occurred for multiple reasons. Firstly, income for young people may not be an appropriate proxy for measuring transactional elements of sexual partnerships. Secondly, young people may have small incomes from their households that were not reported. Thirdly, individuals in lower income quintiles may spend larger proportions of their income on partnerships compared to individuals in higher income quintiles.<sup>22</sup> Further research using more refined notions of wealth and income may be required to understand the relationship between income or wealth and concurrency.

Another important finding is the strong correlation between concurrency and knowledge that a partner has concurrent partners. Although causation cannot be demonstrated, there are several possibilities to explain this link. Individuals may choose partners like themselves who are unlikely to be in monogamous partnerships. Alternatively, individuals after initiating a partnership and learning of their partners' infidelities may be more likely to engage in concurrent partnerships. In either case, this demonstrates the importance of social norms that either condone

or condemn concurrent partnerships. If such partnerships are condoned, partners may be more likely to engage themselves in the behavior. The programmatic implications of this finding point to the fact that perceptions of concurrency within a community or at least partner's concurrency may be an important determinant. Decreasing the levels of concurrency within a population will have the double benefit of reducing concurrency itself and reducing a potential motivating factor (partner's concurrency). However, this finding should be considered cautiously, since reporting on partner behaviors may be unreliable.<sup>23</sup>

This analysis has several other limitations that should be considered. First, the definition of the dependent variable may underestimate the true occurrence of concurrency in this population. Additionally, it is possible that responses related to sexual history were influenced by several differential biases, including recall and social desirability bias. However, such biases are likely to result in the estimates of prevalence being too low, rather than too high. The cross-sectional nature of the analysis does not allow causal associations to be made between concurrency and the other variables.

In conclusion, concurrency is prevalent among a significant minority of the study population. HIV prevention interventions that address concurrency need to consider the various social, economic and cultural factors that influence peoples' engagement in concurrency. Additionally, concurrency messages may need to be tailored to specific sub-populations (e.g. young Black men) and may be appropriate for some populations, while not for others. The clustering of sexual risk factors that accompany concurrency among young people demonstrates the need for more interventions to address sex in a comprehensive manner. Additional research to understand the causal links between determinants of concurrency, concurrency, and HIV acquisition and transmission are still needed.

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**Table 1. Percentages Distribution of Sexually Active Respondents for Selected Characteristics. Cape Area Panel Study, Wave 3, 2005.**

Variable Description	Total n <sup>a</sup>	n <sup>a</sup>	% <sup>b</sup>
<b>Sex</b>	2486		
Young men		1145	47.9
Young women		1341	52.1
<b>Age</b>	2486		
15-19 years		665	22.9
20-24 years		1575	66.0
≥25 years		246	11.1
<b>Race</b>	2486		
Black		1313	37.1
Coloured		1012	49.3
White		161	13.6
<b>Education</b>	2486		
Out of school		1012	39.1
In Primary/Secondary school		435	12.8
Out of school (completed grade 12)		812	36.4
In school (post-matric)		227	11.7
<b>Personal Monthly Income</b>	2486		
No income		1493	53.2
Some income		993	46.8
<b>Religion</b>	2462		
No religion		340	11.4
Mainline Christian		1127	49.6
AIC <sup>c</sup> /Zion/Independent		591	21.3
Muslim		199	9.1
Other Affiliations/Denominations		205	8.6
<b>Current Marital Status</b>	2481		
Unmarried		2287	90.8
Married		194	9.2
<b>Self-Assessed HIV Risk</b>	2476		
No risk		954	37.8
Some risk		1290	53.4
HIV+/Refused/Don't know		232	8.8
<b>Age of Sexual Debut</b>	2435		
≤14 years		343	12.5
15-19 years		1908	77.8
20-24 years		184	9.7

<b>Time Since Sexual Debut</b>	2263		
0-2 years		546	24.4
3-4 years		666	28.6
5-6 years		613	27.2
7+ years		438	19.9
<b># Lifetime Sexual Partners</b>	2386		
1-3		2041	85.19
4		152	6.50
5+		193	8.31
<b>Age Gap w/ Most Recent Partner</b>	2486		
Partner is 4 or less years older/younger		1918	77.8
Partner is 5 or more years older		51	1.9
Partner is 5 or more years younger		517	20.3
<b>Most Recent Partner's Concurrency</b>	2345		
Partner did not have concurrent partners		2002	87.8
Partner did have concurrent partners		343	12.2
<b>Co-Residence with Most Recent Partner</b>	2345		
Does co-reside		453	23.5
Does not co-reside		1892	76.5
<b>Condom Use with Most Recent Partner</b>	2358		
Never use		544	24.7
Consistently use		1071	43.1
Inconsistently use		743	32.2

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a. Unweighted

b. Weighted

c. AIC - African Independent Churches

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**Table 2. Percentage of Respondents Reporting Concurrency and Multivariate Logistic Regression Model Results: Odds Ratios, 95% Confidence Intervals, and P-Values. Cape Area Panel Study, Wave 3, 2005.**

Variable Description	%	Multivariate		
		aOR	(95% CI)	<i>p</i> value
<b>Total</b>	12.8			
<b>Sex</b>				
Young men	20.4	1.00		
Young women	6.2	0.21	0.15-0.30	<b>&lt;0.01</b>
<b>Age</b>				
15-19 years	14.0	1.00		
20-24 years	12.6	0.54	0.35-0.83	<b>0.01</b>
≥25 years	11.4	0.31	0.16-0.60	<b>&lt;0.01</b>
<b>Race</b>				
Black	21.8	1.00		
Coloured	8.6	0.41	0.29-0.58	<b>&lt;0.01</b>
White	2.9	0.18	0.06-0.58	<b>&lt;0.01</b>
<b>Education</b>				
Out of school	14.6	1.00		
In Primary/Secondary school	14.9	0.68	0.42-1.10	0.12
Out of school (completed grade 12)	12.4	0.98	0.70-1.39	0.93
In school (post-matric)	5.6	0.41	0.20-0.87	<b>0.02</b>
<b>Current Marital Status</b>				
Unmarried	14.0	1.00		
Married	2.3	0.19	0.08-0.49	<b>&lt;0.01</b>
<b>Time Since Sexual Debut</b>				
0-2 years	6.9	1.00		
3-4 years	11.0	1.32	0.80-2.18	0.27
5-6 years	15.2	2.11	1.23-3.62	<b>0.01</b>
7+ years	19.5	2.46	1.37-4.41	<b>&lt;0.01</b>
<b># Lifetime Sexual Partners</b>				
1-3	10.5	1.00		
4	18.8	1.77	0.98-3.21	0.06
5+	32.4	2.94	1.93-4.48	<b>&lt;0.01</b>
<b>Most Recent Partner's Concurrency Status</b>				
Partner did not have concurrent partners	9.6	1.00		
Partner did have concurrent partners	35.7	5.52	3.95-7.71	<b>&lt;0.01</b>

N	2127
Log pseudolikelihood	-621.5
Likelihood ratio test ( <i>p</i> -value)	0.000
Area under the ROC curve	0.822
Hosmer-Lemeshow Goodness-of-fit test ( <i>p</i> -value)	0.39

a. All *p*-values are based on the Wald statistic

b. AIC: African Independent Churches

c. Likelihood ratio test - comparing previous models (not shown) to final model