"I don't use a condom (with my regular partner) because I know that I'm faithful, but with everyone else I do": The cultural and socioeconomic determinants of sexual partner concurrency in young South Africans

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Abstract

Finding ways to reduce the high rates of sexual partner concurrency is increasingly believed to be vital to controlling HIV spread in southern Africa. We describe the frequency and correlates of sexual partner concurrency in a representative sample of 3 324 young South Africans aged 14-25. Of the 2 468 individuals who were sexually active 21% had engaged in concurrent sexual partnerships. Multivariate analysis revealed that concurrency was more common with males, Africans, those who knew their partner had another partner, early age of sexual debut, four or more lifetime sexual partners, alcohol consumption, and self-perception of being at high risk for acquisition of HIV. If the respondent's partner knew his or her friends (termed high structural embeddedness) this was associated with a 52% reduction in concurrency rates. There are significant differences in both the rates of concurrency and the risk factors underpinning these in the different racial/ethnic groups. Analysis of these underlying determinants suggests that cultural rather than socioeconomic factors predominate, which has important implications for the design and targeting of prevention efforts.

Keywords: Sexual partner concurrency, HIV, southern Africa, cultural, socioeconomic, structural embeddedness.

Résumé

Trouver des moyens de réduire les taux élevés de concomitance de partenaires sexuels (une même personne ayant deux ou plusieurs relations se chevauchant sur le moyen terme) est de plus en plus considéré comme vital pour contrôler la propagation du VIH en Afrique australe. Nous décrivons la fréquence et les corrélats de la concomitance des partenaires sexuels dans un échantillon représentatif de 3 324 jeunes Sud-Africains âgés de 14 à 25 ans. Sur les 2 468 individus qui étaient sexuellement actifs, 21% d'entre eux étaient impliqués dans des relations sexuelles concomitantes. L'analyse multivariée a révélé que la concomitance était plus fréquente chez les hommes, les noirs africains, ceux qui savaient que leur partenaire avait un autre partenaire, ceux qui ont eu leurs premiers rapports sexuels à un jeune âge, ceux qui ont eu plus de trois partenaires dans leur vie. La concomitance dépendait aussi de la consommation d'alcool et de la perception d'être ou non une personne à risque à l'égard de la contamination par le VIH. Le fait pour la personne interrogée de connaître les amis de son partenaire (appelé haut niveau d'encastrement structurel – 'embeddedness') a été associé à une réduction de 52% des taux de concomitance. Il existe des différences significatives dans à la fois les taux de concomitance et les facteurs de risque pouvant expliquer ces taux dans les différents groupes raciaux/ethniques. L'analyse de ces déterminants sous-jacents suggère que ce sont davantage les facteurs culturels que les déterminants socioéconomiques qui prédominent, ce qui a des implications importantes pour la conception et le ciblage d'une politique de prévention.

Mots clés: Concomitance de partenaires sexuels, VIH, Afrique australe, culturel, socioéconomique, encastrement structurel.

Introduction

Consensus is emerging that the rapid and extensive spread of HIV in southern and eastern Africa is related less to the lifetime numbers of sexual partnerships, and more to the high proportion of these partnerships that are arranged concurrently (Mah & Halperin, 2008). A recent joint inquiry by the Southern African Development Community and UNAIDS concluded that high levels of multiple and concurrent sexual partners are key drivers of the HIV epidemic in southern Africa (SADC, 2006). As a corollary, it becomes necessary to identify the determinants of high concurrency rates.

Studies thus far have proposed various cultural and socioeconomic factors as being responsible. Caldwell, Caldwell and Quiggin (1989, p. 187) argued that sexual relationships involving multiple partners may be part of a historically entrenched "distinct and internally coherent African system of sexuality." Leclerc-Madlala (2000, p. 4) has been more explicit in pointing out the role of the "high-risk sexual culture and the silence that enshrouds it" in facilitating the spread of HIV in southern Africa. "There is a great reluctance," she writes, "by Africans to come to terms with the real sexual cultures of their societies." Examples given include the "widespread belief that males are biologically programmed

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to need sexual relations regularly with more than one woman, and often concurrently. Such beliefs are logically consistent with societies which were traditionally polygamous."

In contrast, a large body of literature has put more emphasis on structural causes of multiple and concurrent partnerships (MCPs). (Hunter 2002; Kaufman & Stavrou, 2004 Leclerc-Madlala 2004 Luke, 2003; Selikow Zulu & Cedras, 2002). For example, it has been argued that the migrant labour system, imposed under colonial and apartheid rule, transformed South Africa into an "HIV epidemic waiting to happen" (Marks 2002, p. 13). By forcing men to spend lengthy periods of time far away from their wives and family, the migrant labour policy encouraged these men to acquire partners in and around their work places (Marks 2002). Kark (1949) demonstrated how important this process was in the genesis of the syphilis epidemic in South Africa. Hunter (2007) has persuasively developed this argument by revealing how three interlinked dynamics of post-apartheid South Africa have come together to promote MCPs and thereby, the spread of HIV: (1) rising unemployment that leave some groups such as poor women competing for the small pool of employed men; (2) reduced marital rates amongst Africans; (3) rising levels of women's migration.

Over the past three years results from three important surveys have been published, which have looked in greater detail at the reasons underpinning high MCP rates in southern Africa. In 2007, the Soul City Regional Collaboration Programme conducted 170 focus group and 116 in-depth interviews among persons aged 15 or older in its ten country participants (Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe) to ascertain the attitudes and practices around sexual relations, with a focus on MCPs. They found very similar reasons for MCPs across these countries: dissatisfaction with main relationships; social norms (cultural, gender, and peer-pressure issues); poverty and materialism; male domination; and alcohol use (Jana, Nkambule, Tumbo, Goldstein & Weiner, 2007). A qualitative study of 18-24 year old Zambian university students revealed similar findings (Nshindano & Maharaj, 2008).

The Centre for AIDS Development, Research and Evaluation (CADRE) survey involved a cross-sectional HIV/AIDS communication survey of a nationally representative sample of 7 006 South Africans aged 15-65 years old (Parker, Makhubele, Ntlabi & Connolly, 2007. This was followed by qualitative research involving interviews and focus groups with 20-30 year olds. Its main findings were that concurrent sexual relations were common in 20-30 year olds, and the main reasons underlying this phenomenon "involve an intersection between socioeconomic and cultural contexts that are intertwined with individual psychological factors related to self-esteem and fatalism" (Parker *et al.*, 2007 p. 14). The contributory socioeconomic factors included the pervasive way in which sex could be exchanged for material goods and money in settings of extensive poverty and inequality. The cultural factors included the commonly held belief that having many partners, particularly for men, was the norm.

These studies have succeeded in outlining a large number of putative factors responsible for the genesis of high concurrency rates in southern/eastern Africa. While it is likely that a complex interplay involving both cultural and socio-economic factors were responsible for the genesis of the strikingly high concurrency rates seen in this region, it would still be useful to see if any of these factors were dominant in the maintenance of these high rates.

The Cape Area Panel Survey (CAPS; described below) is one of the first African surveys to collect sufficiently detailed information on respondent and partner concurrency, and on a big enough sample, to conduct quantitative analyses that could better undertake these sorts of analyses. Mah (2008) carried out a multivariate regression analysis on the CAPS data looking at the determinants of "last-partner" concurrency. This was defined as the proportion of sexually active individuals who reported having had a concurrent sexual partnership during their last sexual relationship. In the final reduced multivariate model the only statistically significant correlates of concurrency were: males, individuals younger than 20 years old, being unmarried, individuals whose current partner had another partner, having five or more lifetime partners, a time period of more than five years since the respondents sexual debut, and African race.

Data from the National Longitudinal Study of Adolescent Health found that adolescents in concurrent relationships were two times more likely to report a regrettable sexual situation owing to alcohol use than those in single relations (Kelley, Elaine, Borawski, Flocke & Keen, 2003). Work from the Chicago Health and Social Life Survey (CHSLS) has shown that the degree to which a relationship is "structurally embedded" in the partner's social networks can have a powerful effect on the probability of either partner having other concurrent relationships (Youm & Paik, 2004).

We could not find any quantitative research that had been done in Africa that explored the role of alcohol and structural embeddedness in the genesis of concurrency. We therefore conducted an analysis of the CAPS cohort to see if there was a similar relationship in South Africa, and also to tease out the relative importance of the cultural and socioeconomic determinants of concurrency.

Data and methods

CAPS is a representative longitudinal study of adolescents aged 14-25 living in Cape Town. It uses a two-stage probability sample of households. The first stage sample used the 1996 census enumeration areas as a sampling frame. Since these areas are generally homogenous as far as race is concerned, the White African and Black African areas were over-sampled so as to obtain relatively equal numbers of youth in each of the three racial categories. The second stage randomly sampled households in each of the chosen enumeration areas. In each of the elected households, youth questionnaires were administered to up to three young people, and one adult completed the household questionnaire. In the first wave, in 2002, 4 752 adolescents were interviewed. A second wave was conducted in 2004, and in the third wave conducted in 2005, 3 324 of the initial 4 752 individuals were re-interviewed.

Participants were interviewed about their socio-demographic, education, employment, health ailments and sexual behaviour histories. The retention rate between waves one and three was 75% overall, but varied by racial group – Africans (70%), coloureds

Table 1. Percentages of all sexually active respondents reporting concurrency and odds ratios, 95% confidence intervals and p-values from univariate and multivariate analyses for all races

Factor	Category	% reporting concurrency	Univariate			Multivariate		
			Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Sex	Male*	31.3						
	Female	12.1	0.28	0.22-0.36	0.000	0.26	0.18-0.38	0.000
Age	15-19 years old*	20.1						
	20-24	20.7	0.92	0.71-1.21	0.556			
	>=25	21.1	0.89	0.59-1.34	0.564			
Race	African*	29.1						
	Coloured	12.3	0.37	0.28-0.47	0.000	0.44	0.29-0.68	0.000
	White	5.2	0.13	0.05-0.31	0.000	0.27	0.07-0.98	0.047
Marital status	Unmarried*	22.1						
	Married	6.7	0.50	0.35-0.73	0.000	0.78	0.42-1.45	0.432
Wealth Quintiles†	1 (Poorest Quintile)*	25.4						
	2	24.1	0.95	0.72-1.25	0.692	1.08	0.75-1.57	0.677
	3	17.1	0.58	0.42-0.80	0.001	1.05	0.63-1.73	0.851
	4	18.1	0.66	0.46-0.95	0.024	1.12	0.64-1.97	0.697
	5 (Wealthiest)	8.0	0.25	0.14-0.45	0.000	0.56	0.18-1.73	0.314
Education (maximum grade attained)	Grade 0-7*	22.7						
	Grade 8-11	22.8	0.95	0.64-1.40	0.794	1.26	0.75-2.09	0.382
	Grade 12	18.6	0.76	0.50-1.14	0.190	1.52	0.86-2.68	0.148
	Post Matric Degree/Diploma	14.1	0.38	0.21-0.68	0.001	1.24	0.53-2.94	0.618
Partners acquaintance with family	Does know family	15.5	0.29	0.22-0.38	0.000	0.95	0.63-1.41	0.782
	Does not know family*	35.2						
Partners acquaintance with friends	Does know friends	18.5	0.27	0.22-0.38	0.000	0.48	0.26-0.90	0.021
	Does not know friends*	37.6						
Lived in same house as partner	Yes	9.1	0.30	0.19-0.46	0.000	0.50	0.26-0.97	0.04
	No*	22.2						
Partner engaged in concurrency	Yes	48.4	5.21	3.86-7.02	0.000	5.43	3.73-792	0.000
	No*	14.8						
Length of sexual relationship	< 1 month	39.8	3.30	2.17-5.01	0.000	1.22	0.62-2.39	0.564
	>= 1 month	16.7						
Time since sexual debut (years)	0-2*	11.0						
	3-4	18.9	1.83	1.23-2.72	0.003	0.98	0.59-1.63	0.935
	5-6	25.0	2.78	1.87-4.13	0.000	1.48	0.97-2.52	0.143
	>=7	28.6	3.45	2.32-5.13	0.000	1.07	0.59-1.93	0.824
Age gap	Partner is >=5years younger*	30.3						
	Between 4 years older and younger	21.5	0.55	0.26-1.17	0.119	0.59	0.40-0.88	0.009
	Partner is >=5 years older	9.9	0.23	0.10-0.55	0.001	0.28	0.16-0.48	0.000
Always used condom with most recent partner	No*	16.5						
	Yes	23.8	1.62	1.26-2.12	0.000	0.89	0.62-1.26	0.501
Self-perceived risk of HIV	Little/no risk*	19.2						
	Some/great risk	29.2	2.07	1.58-2.72	0.000	1.77	1.20-2.61	0.004
	Don't know/refused	17.5	0.94	0.63-1.42	0.798	0.69	0.38-1.26	0.232
Age at sexual debut	<= 15 years old	33.1						
	16-17	21.3	0.50	0.39-0.65	0.000	0.59	0.40-0.88	0.009
	>=18	9.0	0.15	0.11-0.23	0.000	0.28	0.16-0.48	0.000
Ever pregnant	Yes	18.6	0.85	0.68-1.07	0.161			
	No*	22.2						
Volunteered knowledge of HIV avoidance‡								
• Abstain from sex	Yes	19.4	0.79	0.62-1.00	0.054			
	No*	21.6						
• Use condoms	Yes	21.8	1.98	1.32-2.99	0.001	1.88	1.05-3.39	0.035
	No*	13.0						
• Stick to one sex partner	Yes	10.3	0.34	0.23-0.52	0.000	0.64	0.33-1.21	0.168
	No*	23.3						
• Partner take an HIV test	Yes	21.7	0.37	0.21-0.65	0.001	0.71	0.34-1.51	0.379
	No*	11.0						
Alcohol	Yes*	25.2						
	No	17.7	0.69	0.54-0.89	0.004	0.61	0.43-0.87	0.006
Personally know someone sick with HIV/AIDS	Yes*	26.6						
	No	18.1	0.57	0.46-0.72	0.000	0.89	0.63-1.26	0.526
Number of sex partners ever	1-3*	16.9						
	4-5	44.2	3.51	2.46-5.00	0.000	3.81	2.33-6.23	0.000
	>=6	64.6	8.91	5.34-14.8	0.000	5.77	2.27-14.66	0.000

*Reference group.

†The wealth quintiles variable is established as follows: each house is allocated to one of five income bands based on the per capita income of the household, i.e. the total household income divided by the number of inhabitants in the household.

‡These variables were derived from a question where individuals were asked to list all the ways they knew to avoid contracting HIV.

(85%), and whites (60%). The lower retention rate amongst whites is typical of survey research in South Africa, and is thought to be related to a higher rate of moving out of the area and higher opportunity costs involved in completing the questionnaire (Anderson, Beutel & Maughan-Brown, 2007). For a complete details of sampling methodology, non-response and attrition rates, see Lam, Seekings and Spark (2006). All of our analyses are weighted to correct for sample design and appropriate wave non-response. The analyses presented here were restricted to all persons who were sexually active in wave three and completed the wave three questionnaires – a total of 2 468 respondents. The data used were derived from wave three, which included a module on Sexual Activity. This began with questions pertaining to the respondent's first sexual partnership, and then proceeded to capture the same set of partnership variables for each of the respondent's subsequent ten sexual partners.

Measures

Concurrent sexual partnerships can be defined as "relationships where an individual has overlapping sexual relationships with more than one person" (Mah & Halperin, 2008, p 19). The dependent variable evaluated in our study was defined as concurrency during any sexual relationship among sexually active individuals. If an individual had more than one relationship involving a concurrent partner, then the most recent of these relationships was chosen. This was to avoid the bias introduced by selecting more than one relationship per individual. If a person had had no concurrent relationships, then the most recent relationship they were involved in was used for the analysis. Mah and Halperin (2008) utilised "concurrency in the most recent relationship" as the dependent variable. The problem with this approach is that it only picks out 13% of the individuals as having had concurrent relationships, where our definition includes all 21% of persons who have engaged in concurrency. Whilst each definition has its advantages, we believe Mah's approach may dilute any associations by misclassifying a third of persons who have engaged in concurrency into the non-concurrency group.

The dependent variable was derived from the question "Did you have any other sexual partners during the time that you and (partner number 1-10) were having a sexual relationship?" The answer was coded as "definitely yes", "not sure" or "definitely no." A total of 129 individuals who refused to answer this question were excluded form the analysis. Those who responded "not sure" and "definitely no" were grouped together to produce a dichotomous

variable: those responding "definitely yes" and those responding "definitely no" or "not sure." This approach may have lead to an underestimate of respondent concurrency.

Both individual-level and partnership-level variables were used as independent variables in the regression analysis. The partnership variables refer to variables relating to the index-partner – the partner at the time of the (most recent) concurrent relationship. Since the sexual histories were collected chronologically (from the first to the tenth partner), in the case of concurrent relationships these partnership variables pertain to the relationship which started first – and not to the relationship which developed subsequently. If the respondent had engaged in no concurrent relationships then the partner of the most recent relationship was used. These partnership variables were: age gap with partner, condom use with partner, co-residence with partner, whether or not the partner knew the respondent's family and friends, if the partner had concurrent relationships during the index relationship, and the length of sexual relations with the partner. The following individual level variables were evaluated: sex, age, education attainment, wealth, marital status, age at sexual debut, time since sexual debut, perception of HIV risk, alcohol usage in the last month, volunteered knowledge of various HIV prevention strategies, and lifetime number of sexual partners.

Statistical analysis

Analyses were conducted in STATA Version 10, utilising the survey methodology to adjust for the complex two stage survey design. When appropriately weighted for over sampling of Africans and whites, as well as non response, the results are representative of metropolitan Cape Town. Univariate and multivariate logistic regression was utilised to evaluate the strength of the association between respondent concurrency and the independent variables. Risk factors that were found to be associated with respondent concurrency at a significance level of $p<0.05$ were included in the final logistic regression analysis.

Results

Concurrency levels in this population were high; 21% had engaged in at least one concurrent relationship. As shown in Table I, levels varied considerably within subgroups, particularly amongst; males (31%) as opposed to females (12%), and Africans (29%) as compared to coloureds (12%) and whites (5%). Concurrency was also more common amongst the unmarried, the poorer two income quintiles, those with lower educational outcomes, those

Table 2. Concurrency rates stratified by race and sex (expressed in percentages, with number of persons who have engaged in concurrency/total number of individuals in parentheses)

| | Wealth quintiles | | | | | | |
	1(poorest)	2	3	4	5(richest)	Total	p-value*
African Males	40.5 (100/247)	41.6 (77/185)	35.2 (25/71)	52.2 (24/46)	30.8 (24/46)	40.9 (230/562)	0.315
African Females	20.6 (72/349)	19.4 (44/227)	15.5 (13/84)	18.2 (8/44)	0 (0/3)	19.4 (137/707)	0.737
Coloured males	20.3 (12/51)	30.6 (30/98)	22.8 (32/140)	15.7 (23/146)	14 (7/50)	21.1 (104/493)	0.085
Coloured females	2.6 (2/76)	0.79 (1/126)	1.5 (2/132)	7.1 (8/113)	2.7 (1/37)	2.9 (14/484)	0.041
White males	0 (0/0)	0 (0/1)	0 (0/0)	6.3 (1/16)	3.7 (2/54)	4.2(3/71)	0.842
White females	0 (0/1)	33.3 (1/3)	0 (0/1)	0 (0/9)	5.6 (4/72)	5.8 (5/86)	0.311

*p-value: Wald test.

Table 3. Odds ratios, 95% confidence intervals and p-values from univariate and multivariate analyses for Africans and coloureds

Factor	Category	Africans Univariate OR	95% CI	p-value	Africans Multivariate OR	95% CI	p-value	Coloureds Univariate OR	95% CI	p-value	Coloureds Multivariate OR	95% CI	p-value
Gender	Female	0.32	0.25-0.42	0.000	0.28	0.18-0.43	0.000	0.11	0.06-0.20	0.000	0.18	0.09-0.38	0.000
Age	15-19 years old												
	20-24	0.99	0.74-1.32	0.939				1.05	0.63-1.76	0.838			
	>=25	0.95	0.62-1.44	0.799				0.59	0.22-1.55	0.287			
Marital status	Unmarried	0.59	0.41-0.86	0.006	0.80	0.44-1.47	0.472	0.51	0.27-0.94	0.031	0.71	0.28-1.80	0.467
Wealth quintiles	1 (Richest)*												
	2	1.05	0.78-1.41	0.740				1.53	0.77-3.09	0.225			
	3	0.74	0.48-1.15	0.180				1.22	0.62-2.45	0.556			
	4	1.51	0.93-2.44	0.093				1.39	0.73-2.67	0.314			
	5 (Poorest)	0.55	0.16-1.86	0.337				1.27	0.47-3.46	0.625			
Education (maximum grade attained)	Grade 0-7*												
	Grade 8-11	0.80	0.51-1.28	0.351	1.28	0.66-2.48	0.463	0.80	0.40-1.59	0.523			
	Grade 12	0.59	0.36-0.99	0.046	1.01	0.47-2.18	0.980	1.08	0.57-2.06	0.813			
	Post Matric	0.63	0.35-1.11	0.109	0.72	0.26-1.99	0.521	0.63	0.22-1.81	0.388			
	Degree/Diploma												
Partner does not know family		0.56	0.41-0.75	0.000	1.04	0.70-1.55	0.840	0.21	0.12-0.34	0.000	0.66	0.30-1.46	0.302
Partner does not know friends		0.59	0.36-0.99	0.044	0.69	0.36-1.30	0.244	0.22	0.09-0.54	0.001	0.63	0.21-1.91	0.416
Never lived in same house as partner		0.52	0.27-0.99	0.047	0.82	0.35-1.92	0.645	0.32	0.17-0.60	0.000	0.41	0.14-1.21	0.105
Partner has a concurrent sexual partner		5.40	3.81-7.63	0.000	8.45	5.56-12.84	0.000	2.66	1.46-4.86	0.002	3.80	1.53-9.45	0.004
Time since sexual debut (years)	0-2*												
	3-4	1.44	0.89-2.32	0.138	1.22	0.62-2.41	0.562	1.72	0.91-3.26	0.093	1.05	0.48-2.30	0.900
	5-6	1.69	1.03-2.77	0.035	1.50	0.71-3.16	0.278	3.61	1.90-6.86	0.000	2.10	0.97-4.53	0.059
	>=7	1.88	1.17-3.01	0.009	1.24	0.58-2.66	0.566	4.53	2.35-8.71	0.000	1.57	0.63-3.92	0.330
Age gap	Partner is >=5years younger*												
	Between 4 years older and younger	0.75	0.29-1.94	0.555	0.74	0.23-2.43	0.620	2.91	0.36-23.37	0.313			
	Partner is >=5 years older	0.28	0.10-0.79	0.016	0.51	0.13-1.96	0.321	0.44	0.40-4.94	0.506			
Used condom with most recent partner	Yes*												
Perceived risk of HIV	No	1.25	0.94-1.66	0.125				1.58	0.95-2.62	0.380	0.47	0.22-0.98	0.045
	Little/no risk*												
	Some/great risk	1.34	1.03-1.74	0.03	1.07	0.72-1.58	0.750	2.66	1.57-4.48	0.000	2.63	1.34-5.18	0.005
	Don't know/refused	0.84	0.55-1.28	0.427	0.84	0.41-1.71	0.626	0.64	0.25-1.59	0.329	0.30	0.08-1.09	0.067
Age at sexual debut	<= 15 years old*												
	16-17	0.67	0.50-0.90	0.008	0.68	0.44-1.06	0.086	0.43	0.26-0.70	0.001	0.46	0.22-0.92	0.03
	>=18	0.39	0.26-0.58	0.000	0.58	0.31-1.06	0.075	0.06	0.02-0.13	0.000	0.10	0.04-0.28	0.000
Volunteered method of HIV avoidance:	Yes	1.34	0.86-2.07	0.191				4.04	1.56-10.41	0.004			
• Use condoms	Yes	0.58	0.37-0.91	0.019	0.47	0.20-1.21	0.087	0.49	0.25-0.94	0.033	3.43	1.03-11.40	0.045
• Stick to one sex partner	Yes	1.66	0.71-3.84	0.238				0.44	0.19-1.03	0.060	0.89	0.36-2.19	0.804
• Partner take an HIV test	Yes												
Alcohol use in last month	Yes	0.40	0.30-0.54	0.000	0.54	0.35-0.85	0.007	0.41	0.26-0.66	0.000	0.83	0.46-1.51	0.542
Personally know someone HIV +	Yes	0.93	0.72-1.19	0.572				0.83	0.51-1.36	0.453			
Number of sex partners ever	1-3*												
	4-5	2.21	1.49-3.26	0.000	3.14	1.62-6.10	0.001	5.83	3.01-11.2	0.000	4.00	1.76-9.07	0.001
	>=6	8.33	4.43-15.62	0.000	10.20	1.67-62.12	0.012	14.52	6.47-32.5	0.000	3.64	1.11-11.92	0.033

* Reference group.

who perceived their risk of HIV to be high, those with a young age of sexual debut, those who drank alcohol in the last month, and those who personally knew someone sick with HIV/AIDS. There was also a marked stepwise increased rate with increasing numbers of lifetime sexual partners and an earlier age of sexual debut.

Partnership level variables associated with increased concurrency rates included those whose partners did not know their family or friends, and those whose partners were four or more years younger than the respondent. Knowing that one's partner was engaging in another concurrent relationship increased one's odds of concurrency by 5-fold (Table 1).

In the multivariate model, the strongest predictor of respondent concurrency was knowledge that one's partner at the time was engaging in another concurrent relationship. Women, coloureds and whites were less likely to have had a concurrent relationship. Having four or more lifetime sexual partners, alcohol consumption, self-perception of being at high risk for acquisition of HIV, and listing condoms as an HIV prevention strategy were all correlated with significantly increased concurrency rates. Cohabitation with one's partner as well as one's partner knowing one's friends were both associated with reduced concurrency rates (Table 1). Education level, income category, marital status, time since sexual debut, condom usage with current partner, and knowledge about other HIV prevention strategies were not significant in this model.

Multivariate models 2 and 3 were stratified by race: model 2 by Africans only, and model 3 by coloureds only. In both models, male gender, partner concurrency and the lifetime number of sexual partners were strongly associated with increased concurrency. The two models also revealed certain differences. Amongst Africans, but not coloureds, alcohol consumption was correlated with increased concurrency rates. Amongst coloureds, but not Africans, self-perception of being at high risk for HIV infection was associated with a more than doubling of concurrency rates. Age of sexual debut above 16 was likewise correlated with lower concurrency rates in coloureds only.

Discussion

Concurrency rates in this population were very high, but varied dramatically within different subgroups. These differential concurrency rates help to unpack the correlates of concurrency, and to map out the possible pathways through which they may act.

Broadly speaking there are two main categories of causal factors that have been put forward to explain elevated concurrency levels — cultural and socioeconomic determinants. In separating the cultural and the socioeconomic in this way, it is important not to embrace a static view of culture, which implies some innate form of "African" or other sexuality. It is vital to remember that sexualities are constructed through multiple interactions between material and cultural phenomena (Hunter, 2007). It would, none-the-less, be useful to ascertain if any of the determinants of concurrency were dominant. If, for example, we found a strong version of the socioeconomic theory to hold (i.e. that socioeconomic causes

were necessary causes of concurrency), then it would be futile to attempt to reduce concurrency rates by behavioural intervention change interventions alone.

The data from this representative sample of youth from Cape Town provide little support for the strong version of the socioeconomic argument. Although both education and income were correlated with respondent concurrency rates on the univariate analysis, not even a discernable trend in this direction remained on the multivariate analysis. Furthermore, no quantitative study that we are aware of has been able to find a relationship between income and concurrency. The only studies that we are aware of that have found a relationship between education levels and concurrency, have found that increasing education outcomes were associated with higher concurrency rates (Adimora, Schoenbach, Bonas, Martinson, Donaldson & Stancil, 2007; Youm & Paik, 2004).

The main socioeconomic pathway that leads to increased concurrency that has been put forward in various ethnographic studies is that relatively poor women (and to a lesser extent men) are induced into taking more than one sexual partner concurrently, as this is one of the only options available to them to secure the necessities or luxuries of life (Kaufman & Stavrou, 2004 Leclerc-Madlana, 2004).

If this dynamic were in operation, then we would expect to find higher respondent concurrency rates among poorer women and richer men, and in areas of greater income inequality. This is not what we found in the CAPS data. When the data were stratified by race and gender, there was no significant difference between income group and concurrency rates for males or females – except in coloured women where richer females were more likely to engage in concurrent relationships themselves - the reverse of what was predicted by the socioeconomic thesis (See Table 2). The results for partner concurrency were similar. There was no relationship between partner concurrency and income in any of the groups stratified by race and gender. Concurrency rates in this population clustered predominantly on the basis of race and gender – rates were not higher in the poorer individuals in all races, but rather in Africans of all income groups and in males.

Rose (1993) argues that in talking about causation, one needs to break this down into two aspects – causes of cases (i.e., why does individual X have a particular trait K?) and causes of incidence (i.e., why does population Y have such a large number of persons with trait K?). Ethnographies and quantitative studies, which only look at risk factors for particular traits, such as concurrency, within one population, are by definition only able to provide insight as to what the causes of the cases within this population are. The CAPS data is useful, in that it offers us the opportunity to conduct a cross-population analysis to investigate the importance of causes of incidence in explaining different rates of concurrency. The large racial/ethnic differences in concurrency rates remain after controlling for a large range of factors in the multivariate analysis. In particular, we could find no evidence that economic factors accounted for the differences in concurrency rates. This suggests that additional variables, such as cultural/attitudinal differences, were responsible for the higher incidence of concurrency seen in Africans.

Although speculative, one such difference may be the finding by Parker and colleagues (2007) that the concepts of sex and love are often separated. Thus it is commonplace to have sex with love with a main partner, and sex without love with other partners. Under this set of norms, being faithful shifts in meaning from a concept of fidelity to one where keeping infidelity secret (so as to protect one's main partner from knowing about one's other partners) is a sufficient criterion for considering oneself to be faithful. It is within this conceptual framework that we make sense of the statement from one of the informants used in this paper's title:

> *Participant: I'll tell you how I do it with my regular partner. I don't use a condom because I know that I'm faithful, but with anyone else I do, or else she can go, because my need for her is not that much.*
> *Facilitator: But doesn't faithfulness mean being with your one partner?*
> *Participant: That's not how we regard it. You only have unprotected sex with your main partner. To us faithfulness is about using a condom on other partners.*

The racial differences in the life-course patterning of concurrency also suggest that cultural/attitudinal differences are important in generating the racial differentials in concurrency rates. It is not just that Africans end up having higher concurrency rates, but that these elevated rates occur from their first relationship and continue in subsequent relationships. Thus amongst the males, 30%, 18% and 3% of Africans, coloured Africans and whites respectively had an additional sexual partner during their relationship with their first partner. The racial differential in concurrency rates at the time of one's first partnership was even greater in females – 12%, 1% and 2% of African, coloured and white females respectively (Kenyon, Dlamini, Boulle, White & Badri, 2009).

The patterning of these data do not support the contention that concurrency stems primarily from poor women being forced into taking up multiple concurrent relationships to access resources. Rather a large proportion of both genders of young Africans, but most prominently males, start out having concurrent relationships. Concurrency is then more likely to remain a feature of subsequent relationships than for the other races — self-reported concurrency in two or more relationships occurring in 8%, 2% and 1% respectively of Africans, coloured Africans and whites (Kenyon *et al.*, 2009).

Work from the Chicago Health and Social Life Survey (CHSLS) has shown that the degree to which a relationship is "structurally embedded" in the partner's social networks can have a powerful effect on the probability of either partner having other concurrent relationships (Youm & Paik., 2004). Structural embeddedness is conceptualised as a network characteristic of a couple. Figure 1 demonstrates the difference in embeddedness between two couples. In both scenarios, each member of the relationship has two friends, but in the weakly embedded relationship on the left, neither of the partners knows the other's friends, whereas in the strongly embedded relationship on the right, the friends are shared. Youm and Paik (2004), argue that embeddedness enhances mutual commitment in a relationship via two main mechanisms. Firstly, overlapping friendships enhance monitoring
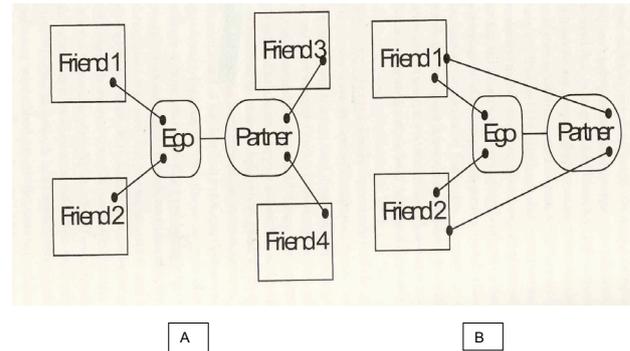

Fig. 1. Structural embeddedness in friendship networks. Networks characterised by weak (left) and strong (right) embeddedness are depicted. (Reproduced from Youm and Paik (2004) with permission.)

efficiency – it is easier for ego in network b to check that partners really did what they claimed to when they come home late at night than in network a. Secondly, if ego has a concurrent relationship, this is more likely to damage ego's reputation in an overlapping network. A multinomial logit analysis of the CHSLS found that among men, relationships that were strongly embedded before the first sexual encounter were seven times more likely to end up in marriage than weakly embedded relationships.

Our analysis of the CAPS data is, to the best of our knowledge, the first which provides evidence of a similar relationship between embeddedness and concurrency in an African setting. CAPS is only able to evaluate two dimensions of structural embeddedness – familial and friendship embeddedness assessed by the questions "did partner number X know your family/friends". The multivariate analysis suggests that even friendships which fulfilled this weak measure of embeddedness, were associated with a halving in concurrency rates.

The racial divergences in the relationship between embeddedness and concurrency are of particular interest (see Table 4). All the groups, excluding African males, showed a considerable reduction of respondent concurrency rates if the partner knew the friends or family of the respondent. In the African males, the concurrency rates were actually marginally higher in the group where the partner knew the family of the respondent, and only slightly lower in the group where the partner knew the friends of the respondent.

One way to explain this finding is by recalling that embeddedness mediates its impact on concurrency via peer pressure, loss of reputation and the like. Thus in a society where the norm is acceptance and even expectation that one gender has multiple concurrent partners, then we would expect that embeddedness would either have little protective effect or even encourage concurrency in that gender. As already pointed out, there is a considerable volume of ethnographic evidence from southern Africa to the effect that "culturally men are allowed to have more than one partner while when women do that they are branded as 'bitches.'" (Jana *et al.*, 2007, p.4.) The data presented here back up this evidence. While partner's embeddedness had no effect on reducing African males concurrency rates it did diminish African female's concurrency rates. Thus encouraging individuals and

Table 4. Effect of structural embeddedness: Respondent concurrency rates versus partner's acquaintance with family and friends (%)

	Partner knows family		
	No	Yes	p-value
African			
• males	42	43	0.754
• females	27	15	0.001
Coloured Africans			
• males	40	18	0.000
• females	25	2	0.000
Whites			
• males	11	4	0.343
• females	25	3	0.004
	Partner knows friends		
	No	Yes	p-value
African			
• males	48	43	0.543
• females	30	17	0.020
Coloured Africans			
• males	46	21	0.003
• females	8	3	0.300
Whites			
• males	50	3	0.002
• females	50	3	0.000

their friends to get to know their partners' friends is only likely to have any chance of reducing concurrency in communities where concurrency is not regarded as acceptable behaviour.

Not only were concurrency rates considerably higher in Africans, but the awareness of its dangers (in terms of HIV transmission) were reduced. Thus for the coloured group, those who engaged in a concurrent relationship were more likely to perceive themselves as being at increased risk of HIV acquisition. In Africans, however, there was no increased perception of HIV risk.

Our study has a number of limitations. Firstly, the sexual behaviour of adolescents differs in important respects from adults, and one should therefore be wary of generalising the results beyond the 14-25 year old age group of this study. Secondly, the results depend on self-reported sexual behaviours, and this may account for some of the differences in reported behaviours between males and females and between the racial groups.

Conclusion

Although the findings of our study cannot be generalised beyond a population of 14-25 year old Cape Town inhabitants, they do nonetheless reveal a dangerous mix of high concurrency rates and decreased "top-of-mind" awareness of its dangers in young Africans. Africans who engaged in concurrency did not consider themselves to be at a higher risk of HIV infection than others. Whilst the interplay between cultural and socio-economic determinants of concurrency are very complex, the finding from this analysis that the socio-economic determinants were not the predominant determinants of concurrency in this population, provides guidance and room for hope in the short-term. The most basic concerns for human rights and dignity should, in and of themselves, make dealing with the extensive poverty and inequality in the region a top priority. Much however could be

done to curb HIV spread by targeting prevention efforts to deal with norms around concurrency, and linked to this, by addressing the low levels of "top-of-mind" awareness as to the dangers of MCP. This analysis corroborates the findings of others who found a strong relationship between index concurrency and knowledge of partner concurrency. If there is indeed a causal link between these two, as has been suggested elsewhere, then even small reductions in concurrency could have a "social snowball effect" (Mah, 2008). Thus small changes in social and cultural norms could induce small numbers of influential persons to reject concurrent relationships, which could establish positive feed back on both the chances of their partners engaging in concurrency and on communal norms. In response to Uganda's "zero-grazing" and other campaigns, the percentage of female and male Ugandans who had sex with a non-marital/non-cohabiting partner decreased from 23% to 9% and 41% to 21% respectively between 1989 and 1995. The fact that these changes in the numbers and concurrency of sexual partners have been demonstrated to be the key initial factor in reducing HIV incidence in Uganda (Kirby, 2008), should provide further impetus to reinvigorate prevention efforts along similar lines in southern Africa.

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