Secretive females or swaggering males? An assessment of the quality of sexual partnership reporting in rural Tanzania

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Secretive females or swaggering males?

An assessment of the quality of sexual partnership reporting in rural Tanzania

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Abstract

In population-based surveys on sexual behaviour, men consistently report higher numbers of sexual partners than women, which may be associated with male exaggeration or female underreporting or with issues related to sampling, such as exclusion of female sex workers. This paper presents an analysis of data collected in the context of a longitudinal study in rural Tanzania, where a sexual partnership module was applied to all participating men and women in the study population. Since the study design included all men and women of reproductive ages and did not involve sampling, these data provide a unique opportunity to compare the consistency of aggregate measures of sexual behaviour between men and women living in the same villages.

The analysis shows that non-marital partnerships are common amongst single people of both sexes – around 70% of unmarried men and women report at least one sexual partner in the last year. However, 40% of married men also report having non-marital partners, but only 3% of married women do so. Single women report about half as many multiple partnerships in the last year as men, and only one-fifth as many overlapping partnership episodes as are reported by single men. Underreporting of non-marital partnerships was much more common among single women than among married women and men. Furthermore, women were more likely to report longer duration partnerships and partnership with urban men or more educated men than with other men. If a woman reports multiple partners however, biological data indicate that this is true. For men however there is a weak association between numbers of type of partnerships and the risk of HIV, and it cannot be excluded that men, especially single men, exaggerate the number of sexual partners.

Key words

Sexual behaviour - Tanzania - data quality - sexual networking - gender differences – HIV/AIDS

Introduction

Surveys have been the primary mode of collection of data on sexual behaviour in the era of AIDS. Initially, the focus of international standardized surveys, such as WHO/GPA surveys and Demographic and Health Surveys, was on initiation of sex, numbers of sexual partners and condom use, with little detailed information on types and characteristics of partnerships. In such surveys, men consistently report higher numbers of sexual partners than women, which may be associated with male exaggeration or female underreporting or with issues related to sampling, such as exclusion of female sex workers (Dare and Cleland, 1994).

Empirical data and epidemiological models have shown the importance of patterns of sexual mixing for the spread of HIV and other sexually transmitted infections (STIs). This includes behavioural heterogeneity (the extent to which the rate of new partner acquisition varies within the population), partner concurrency (the extent to which partnerships overlap or are sequential) and sexual mixing patterns (the extent to which partner selection is not random) (Morris and Kretzschmar, 1997; Anderson, 1999: 25-37). Therefore, the emphasis in survey data collection has shifted to obtaining better data on types and characteristics of partnerships. UNAIDS (1997) developed sexual partnership module, which was used in a four city study in sub-Saharan Africa (Carael and Holmes, 2001; Buve et al., 2001).

This paper presents an analysis of data collected in the context of a longitudinal study in rural Tanzania, where a sexual partnership module was applied to all participating men and women in the study population. Since the study design included all men and women of reproductive ages and did not involve sampling, these data provide a unique opportunity to compare the consistency of aggregate measures of sexual behaviour between men and women living in the same villages.

Methods

The study was carried out in Kisesa ward in Mwanza Region, Tanzania. A ward is an administrative entity that falls under a division of a district and is divided into smaller administrative units, such as village, sub-village and 'balozi' (ten households). Kisesa ward had a population of 20,000 in 1994 and lies about 20 kilometres east of the regional capital, Mwanza, along the main road to Kenya. It comprises six villages and a trading centre situated on the main road, grouped into trading centre, peri-trading centre and agricultural rural villages, for the purpose of this study. More than 90 percent of the population are Sukuma, the largest ethnic group in Tanzania. Farming is the main source of income, while petty trade of agricultural products (milk, tomatoes, maize, rice, fish etc.) is common and results in a large number of mainly male cyclists travelling from the rural areas to Kisesa trading centre and to Mwanza town on a regular basis.

A demographic surveillance system forms the basis of all research activities in Kisesa. In 1994 a baseline census was conducted. Follow-up visits were made every 4-5 months and by the year 2000 thirteen rounds had been completed. During August 1994 - July 1995 (first survey) and again two years later (second survey) detailed surveys of all adults 15-44 and 15-46 years of age respectively were carried out (Boerma et al., 1999). In 1999-2000 a third survey was conducted in Kisesa (Mwaluko et al, 2002). The population was listed using the most recent demographic surveillance round and eligible persons (in the right age group and resident for at least one demographic round prior to the survey) were asked to come to a central point in the village to be interviewed using a structured questionnaire and to give a blood sample for HIV testing. Home visits were made to encourage those who did not attend to participate. The purpose of the study was explained and verbal consent was obtained prior to the interview. The questionnaire was administered in the Swahili language (or in the local vernacular if necessary)

by same-sex interviewers in temporarily constructed huts to maximize privacy and ensure confidentiality.

During the second survey a questionnaire module on partnerships (UNAIDS, 1997) was administered at the end of the interview to 3,700 respondents residing in four of the six villages of Kisesa ward. The interview first focused on background characteristics, marriage, sexual behaviour (numbers of partners and condom use), STDs and treatment seeking behaviour, and knowledge and attitudes related to AIDS. After this, the interviewer showed a set of drawings to the respondents. These drawings showed a man or woman with possible types of single and multiple partnerships. This was followed by questions about the last five non-marital partnerships and up to four marital partnerships. For non-marital partnerships, details were only recorded if the relationship had lasted into the 12-month time period preceding the survey. Marital partnerships include all cohabiting partnerships. Information about sexual abstinence and date of last coitus was sought only for marital partnerships.

Questions about non-marital partnerships included one that permitted approximate dating of the start of each relationship ("How many months ago did sexual intercourse first occur?"). Respondents were also asked to state whether the relationship was continuing, and those who responded that it was not, were asked to say how many days or months it had lasted. From these answers it was possible to calculate the approximate ending date of each non-continuing relationship. Overlapping partnership episodes for the last year were estimated by counting distinct pairs of partnerships that ran concurrently for any length of time. For married persons each non-marital partner overlaps with at least one spouse – as a result, married men experience more overlapping episodes than single men even though they have fewer non-marital partners. Polygamous men also have at least one overlapping spousal partnership,

which inflates their experience of concurrency even more. The question about continuing non-marital partnerships also allowed us to derive a point estimate of overlapping partnerships.

Results

A total of 3,684 respondents took part in the sexual network survey (1,651 men and 2,033 women). Based on listings of the household population in the four villages, this represented approximately 84% participation by women and 77% by men. Reports were obtained on a total of 1,130 male and 803 female spouses, and 549 male and 1,990 female non-marital partners, with whom respondents had sexual relations in the last year. Just over 55% of males and slightly fewer than 30% of females were unmarried, 4% of males and 15% of females were in polygamous marriages. The overwhelming majority (61 of 67) of polygamously married men, had just two wives, four men had three wives each and two had four wives.

Non-marital partners and partnerships

Fewer men than women (Figure 1) report not having any non-marital sexual partners in the last year, with the biggest differences among married respondents – over 95% of married women say they have no non-marital partners, but only around 60% of married men. Non-marital partnerships are less common in polygamous men (34% have non-marital partners) than among the monogamous (41%), but the opposite is true for women (5% polygamously married, compared to 2% monogamously married women have non-marital partners). Overall, 30% of men report two or more partners, only 3% of women. Multiple non-marital partners are much more common among those men and women who are not married. Broadly similar proportions of unmarried men and women report having at least one sexual partner, but 40% of unmarried men say they have had two or more partners in the last year, slightly less than 10% of unmarried women do so. Very high numbers of partners (five or more in the last year) were

reported by 79 men, but by only one woman, with one man reporting more than nine sexual partners in the last year.

Table 1 (upper panel) shows selected summary indices of the extent of non-marital partnerships. The mean number of non-marital partners reported by all males is more than four times that reported by all females (1.21 and 0.27 for men and women respectively), though among non-married respondents there is only a two-fold difference. Married men report half the number of non-marital partners per year reported by unmarried men, married women one-twentieth the number reported by their unmarried counterparts. Overall, 58% of men and 22% of women reported non-marital partnerships in the last year. One-third of men and 4% of women had overlapping partnerships in the last year.

The lower panel of Table 1 presents the mean numbers of non-marital partnerships per respondent reported to be "continuing" at the time of the survey. Single females report a higher mean number of ongoing relationships than single males, though men in all marital status categories report higher numbers of current overlapping partnerships pairs. The high mean number of ongoing partnerships for single women is explained by the fact that of those respondents who have had at least one partnership in the last year, a much higher proportion of women than men regard the most recent of these relationship as ongoing.

Duration of non-marital partnerships

The interpretation of a "continuing" relationship in this context is somewhat problematic, because no direct questions were asked about timing of last coitus with non-marital partners. If a partnership is reported as continuing, this may mean that the respondent feels a commitment to that partner, or presumes that the partner is committed to the relationship, or that there is just

an expectation that sexual intercourse may occur again. The reported duration of a partnership that has ended may also be imprecise, as the end may be defined by an event such as residence change by one of the partners, rather than by a "final" act of sexual intercourse. Table 2 shows the partnership duration estimated for males and females. Female respondents report longer partnership duration for the most recent and the immediately preceding partnerships, but males report longer duration for partnerships further back in the past, though numbers of such partnerships reported by females are too small to draw firm conclusions. The difference is particularly striking for continuing relationships, where females report a mean duration of more than 15 months for the last two partnerships, whereas according to men, the mean duration of such partnerships is about 6 months.

The estimates of duration of partnerships allow us to make use of the well-known epidemiological relationship between incidence and prevalence to ascertain the internal consistency of the data. The proportion of persons who have an ongoing non-marital partnership is a measure of the prevalence of such relationships, the mean number of such partnerships in the year is a measure of their annual incidence, and the product of the incidence and duration, appropriately scaled should be approximately equal to prevalence. Table 3 shows to what extent the reports on number of non-marital partnerships ongoing at survey, number of partners during the year, and the duration of relationships reported by males and females, married and single are internally consistent. *A priori* we would expect that prevalence would be better reported than incidence or duration, since the prevalence estimate depends only on the respondent accurately reporting whether or not they have an ongoing non-marital partnership, whereas reporting of incidence requires retrospective recall of the last year's partnerships, and duration estimates depend on the respondent being able to accurately date the start and end dates of their relationships. The pattern that emerges shows a stronger internal consistency in the responses of married men than in the responses of single men, or those of women. In other

words, married men report a total number of non-marital partners in the last year that is consistent with their total number of ongoing non-marital relationships at survey, and their reports on the duration of these relationships. Women and single men apparently exaggerate either the length of their non-marital relationships, or the number of such relationships in the past year, compared to the number they are currently involved in.

Consistency of male and female reports

Such differences in the reporting patterns of males and females make it important to investigate the consistency with which men and women report the subset of relationships which should be more or less fully reported from both sides: namely those occurring between partners aged 15-46 who both live in those villages where the survey took place. If complete coverage and complete and accurate reporting had been achieved, we would expect that ongoing partnerships between eligible residents in the same village would be reported by both partners. Since absenteeism was greater among males (about 23% did not turn up for the sero-survey and the sexual behaviour interview) than for females (16% did not participate), a higher absolute numbers of within village partnerships should be reported by females than by males. If participation was independent of number and type of sexual relationship, we would expect the number of "within survey" partnerships reported by women to exceed those reported by men by around 9%, since the ratio of participation rates (84% to 77%) is 1.09.

Table 4 shows an internal consistency comparison for reporting of relationships by men and women in those villages that participated in the study. The non-marital partners are those whose relationships were reported to have continued to the date of the survey, whose ages (15-46) would have made them eligible respondents, and who were reported as living in one of the four villages in which the overall survey coverage was over 80%. The total number of such partnerships reported by females (291) is in fact 43% lower than the total number reported by

males (508), whereas we would have expected the opposite, since female participation was higher.

Clearly such a big difference indicates gross under-reporting by females, or a strong tendency to exaggerate the number of partnerships by males. We have already noted a tendency by women to report much longer mean durations of partnerships than those reported by males, so we might tentatively conclude that women particularly under-report casual sex and shorter duration partnerships. Indeed, out of this subset of relationships that should have been reported by both men and women, the number of continuing relationships with duration longer than 6 months reported by women (210) is almost the same as that reported by men (208). The shortfall in reporting by women is made up entirely of shorter relationships, in particular women report only four continuing relationships of less than one month duration, men report 112 of these.

We have further broken down these data by the marital status of the respondent and the partner, to see whether certain types of relationship are more prone to under-reporting. It emerges very clearly that it is the single women who under-report their relationships: a total of 268 non-marital partners from these villages were reported by single women living in the same area, whereas 498 such partnerships are reported by men. That is, if we believe the reports of the men, only 54% of such relationships are reported by the women involved. The proportionate under-reporting is lowest for single women in partnerships with single men – women report only 46% (183 / 399) of the number reported by men. By contrast, the reporting of partnerships by married women is quite good (23 reported by the women themselves, 10 by men) although the overall numbers involved are rather small. There is also close agreement in the reports of partnerships with married men: a total of 105 non-marital partnerships are reported by married men, and 101 women report a sexual relationship with a married man.

One possible reason for inconsistencies in the total number of non-marital partnerships reported by men and women may be the presence of a few single women who have sex with many men about whom they know relatively little – if such women had been interviewed they would report that they did not know the place of residence, age or marital status of the man, (which would mean their exclusion from table 4), whereas the man might presume that such a woman came from the place where they actually had sex, and that the woman was single. Indeed, a higher proportion of women (2.1%) say they do not know the marital status of their non-marital partners than do men (0.7%), but the proportions are small.

Another possible cause of the shortfall of non-marital partners reported by females, may stem from a propensity of single women to describe their male partners as husbands, and themselves as married women. This possibility is reflected in the data on spousal partnerships within the study area: women report a total of 1096 husbands in the age range 15-46 resident in the study area, whereas there are only 801 married male respondents who report their wives are in the eligible age range, a deficit of 295 (27%). A deficit of this size is unlikely to be explained by a lower participation rate amongst married men, because the overall participation rate by men is only 9% less than the female participation rate, and it is unlikely that married men are more mobile (and thus less likely to be resident in the area at the time of the survey) than unmarried men. The biggest discrepancies occur in the reported numbers of husbands aged 30-46 (751) compared with married male respondents in this age group (528), a difference of 42%. Women over 20 contribute almost all the excess reports, whereas the analysis in the previous section concluded that it was unmarried women who under-reported non-marital partners, and these would tend to be concentrated in the under-20 age group.

The same kind of discrepancies are evident if we examine the reported marital status of all non-marital partners, including those resident outside the study villages and not in the eligible age

range. For example, men of all marital statuses report an overwhelming preponderance (over 90%) of single women among their non-marital sexual partners, whereas if we look at the marital status of women who report that they have non-marital partners, single women form 70% of the total. The biggest discrepancies occur among the proportion of partners reported as being widowed, divorced or separated, who are under-reported by both male and female respondents. Only 4% of women and 5% of men report that their non-marital partners were widowed, divorced or separated, whereas the widowed, divorced or separated account for 8% and 35% respectively of all men and women who report having non-marital partners. It might be that such partners are misreported as single simply because some respondents do not know their partner's marital history. But it could be that both men and women try to conceal the fact that they have been previously married from their current partners.

Mixing patterns by age

Respondents were asked to report on a number of characteristics of their spousal and non-marital partners – including age, marital status, residence, education and ethnicity. These reports allow us to assess to what extent partners have similar characteristics to respondents, and whether spouses have similar characteristics to non-marital partners.

From the point of view of spread of HIV, one of the more contentious issues is the formation of partnerships between young women and older men. Men aged 30-44 reported that 25% of their non-marital partners were aged under 20, although less than 10% of women under 20 report relationships with men over 30. Over 5% of all non-marital partners reported by men are aged under 15, but two-thirds of these are reported by males themselves under 20.

This pattern contrasts with spousal age mixing: 3% of married men aged over 30 report that their wives are under 20 years, and almost 20% of married women under 20 report having husbands aged 30 and over. In general, higher proportions of men report having spouses within their own age group than report having non-marital partners close to them in age, but the opposite is true for women.

Table 5 provides more detailed information on age differences between respondents and their spouses and non-marital partners. On average, men are about 7 years older than their wives, and about 5 years older than their non-marital partners. However, this broad picture hides a clear trend with age for male respondents: older men report a much larger age gap with both spouses and partners than younger men – clearly men who become sexually active and marry at younger ages are much more likely to have partners close to their own age than those who marry later.

Women's non-marital partners are younger than their spouses, and the same is true for men if we look at the mean age differences within each respondent age group. Among men who have both marital and non-marital partners, 73% report that their non-marital partners are younger than their spouses. The fact that overall, non-marital partners appear to be closer in age to male respondents than their wives, reflects the age distribution of the respondents: married men tend to be older (mean age 33 years) than those who report any non-marital partnerships (mean 24.2).

For men under 20, the mean age difference for spousal partners is negative, and that for non-marital partners is close to zero, which implies that a sizeable fraction of young men have sexual relations with older women. In fact, 54 men (6% of all those who have non-marital partners) report having older partners – three-quarters of these men are aged under 20. Among

women, 10% report non-marital partners who are younger, half of the women reporting such liaisons are aged 20-29. In general, women report a wider spread of ages than men for both their spouses and their non-marital partners: the standard deviation of partner age difference is 5.5 years for women and 4.6 for men. For both sexes this age spread increases with age of respondent, but the increase is modest for women (from 4.3 to 5.9) and more pronounced for men (from 2.5 to 4.7).

It is somewhat surprising that there is not more reciprocity in the partner age difference patterns between men and women: the reports by both men and women suggest a fair degree of disassortative age mixing: 58% of both spouses and non-marital partners are reported by both male and female respondents to come from an age group different from their own. But given that the sexually active age groups are circumscribed both by custom (sexual activity by teenagers is socially less acceptable) and by demography (the age group 65 and over is so small that few partners would be available in this age group even if people this age were considered attractive partners), we would expect that female reports, like male reports would show more significant variation with age. We might expect the partner age difference reported by females to become narrower with age, and the standard deviation to shrink, the reverse of the pattern reported by males. The lack of this reciprocity suggests that either younger women are under-reporting the extent of their sexual encounters with older men, or that older men under-report the age, if not the number of their sexual partners.

Spatial and social mixing patterns

With respect to spatial distribution of non-marital partners, there is evidence of limited mixing between the villages and the trading centre, or between the ward as a whole and Mwanza town. Nearly 90% of the partnerships reported by men who live in the rural parts of the study area are

with women from other villages in the area; 83% of partnerships reported by rural women are from within the area. Women report a higher proportion (13%) of partners from outside the study area than men (9%), and higher proportions (7%) of women who live in the villages report having lovers in the trading centre at Kisesa than are reported by men who live in the villages (2%), but women are less likely than men to report partners from other villages. Only 2% of men and 8% of women respondents report sexual contacts with people from Mwanza town.

For male respondents, duration of partnership varies relatively little by partner's residence, though partnerships out of the area or across a spatial divide (village – trading centre) tend to be shorter (mean 1.5 months), and those where both respondent and partner live in the Kisesa trading centre last longer (2.3 months). There is much more differentiation between women's reports about partnership duration by residence of partner, and the patterns run in the opposite direction to those suggested by male reports, with the longest relationships reported for those cases where the male partner was from Mwanza town (mean duration 7.1 months) or, in the case of women from the villages, with partners from the trading centre in Kisesa (mean 5.3 months) compared with a mean of 2 months for relationships within the villages. This may constitute further evidence of selective reporting of partnerships by women – the partnerships which are recalled and reported are those with outsiders who may be relatively affluent; the importance of partnerships with men from the villages tends to be down-played.

Reporting of partner's education suggests that partnerships between men from higher social classes with women from lower classes are fairly common, but not the other way round. Among male respondents 12% claim to have a higher educational status than their female partners, and 23% of female respondents report their partners to be more educated than they are. There may be an element of guesswork in the reporting of partner's education, with men tending to over-report primary schooling as their partner's status – over 90% of males report this, but only 75%

of the female respondents with non-marital partners in our sample have a primary education. On the other hand, women may exaggerate the educational status of their lovers, or selectively remember and report those who had a secondary education, since these are over-represented among male partners (12%) compared to male respondents, only 6% of whom have a secondary education. Again there is an evident tendency for women to report longer partnership duration for higher status partners: mean duration of partnerships with men with secondary education is 4.7 months, compared to 2.7 months for those with primary education, the corresponding duration by education of partner reported by males is 1.8 and 2.2 months.

HIV and partnerships

The HIV status data that were collected in the three surveys between 1994 and 2000 permit an examination of the risk of HIV infection with respect to the sexual behaviour indicators. Prevalence data collected at the 1996/97 survey (at the same time as the sexual partnership data) are of somewhat limited use in this respect, since prevalent infections may have been acquired up to a decade before the survey, whereas the sexual behaviour indicators refer to the year preceding the survey. HIV incidence data, on the other hand, pertain to the number of new infections in the inter-survey intervals: two years before the sexual partnership survey, and three years after. Prevalence data are available for almost all participants (1433 men and 1922 women) but incidence data only for those who participated in the first and second surveys (859 men, 1109 women) or the second and third surveys (667 men, 990 women) as well as the second.

Overall, HIV prevalence in the four villages at the time of the 1996/97 survey was 6.5% among men, and 8.4% among women. In the interval between the 1994/95 survey and the 1996/97 survey, the annual incidence rates were 0.6% for males and 0.7% for females. In the later

interval, leading up to the 1999/2000 survey, incidence had doubled to 1.3% and 1.5% for males and females respectively.

Age patterns of prevalence and incidence are shown in figure 2. HIV increases with age for both men and women up to the mid 30s, because age is a measure of exposure to risk of infection. The decline in prevalence at older ages is due in part to the early demise of infected persons, and in part to the fact that those now aged 35 and over had a much lower level of exposure to the virus in their twenties, when the epidemic had barely started in this part of the country. The age specific incidence rates illustrated here are an average over the five-year interval between the first and last surveys. For both males and females incidence peaks in the twenties, but the variation in incidence rates with age does not attain statistical significance.

Table 6 examines the relative risk of HIV infection by reported numbers of partners. Since age is significantly associated with prevalence, but not with incidence, the prevalence relationships are adjusted for age, but the incidence relationships are reported without adjustment. Although the results of the previous analyses suggest gross under-reporting of sexual partners by women, biological measures indicate that male reporting may also be unreliable. If sexual partnerships were accurately reported, there should be a positive correlation between sero-positivity (prevalence) and sero-conversion (incidence) and partner numbers. For both incidence and prevalence there is a very clear progression for females, but for males, only incidence in the interval after the sexual behaviour data were collected is positively correlated with having had a non-marital partner, but not progressively with the number of such partners.

Separate models were also run to examine if certain types of partnerships were associated with higher prevalence or incidence. Partnership characteristics investigated included the occurrence of concurrent partnerships in the last year; having a partner who belonged to an age

group 5 or more years younger or older; having a partner resident outside the village, and having a partner whose marital status indicated a greater degree of past sexual exposure (ever-married partners in the case of never-married respondents, ex-married partners in the case of currently married respondents). None of these partnership factors was significantly associated with increased risk of HIV, with one exception. Men who had a partner 5 or more years younger had a significantly higher risk of sero-conversion in the two years before the survey.

Discussion

The analysis shows that non-marital partnerships are common amongst single people of both sexes – around 70% of un-married men and women report at least one sexual partner in the last year. However, 40% of married men also report having non-marital partners, whereas only 3% of married women do so. Single women report about half as many multiple partnerships within the year as men, and only one-fifth as many overlapping partnership episodes as are reported by single men.

The overall mean number of sexual partners in the last year (spouses and non-marital partners) reported by men is 1.70, for women only 0.98. This type of reporting pattern has been reported in many other populations and since the expectation is that the average number of partners reported by males and females in a closed population should be equal, the imbalance is usually attributed to under-reporting by women (Cleland & Ferry, 1994). In an open population, where partners can come from outside the survey sample, the imbalance has also been attributed to the omission from the household-based sample of women with atypically large numbers of partners (e.g. sex workers) and the exclusion on eligibility grounds of men with relatively small numbers of partners (e.g. older men, absentees).

In the present study we can allow for such artificial exclusions to some extent, by limiting the analysis to those partnerships where respondents report that their sexual partners are within the eligible age range and live in the completely enumerated study area. However the strong male – female reporting differences still persist, even if we allow for the miss-classification of non-marital partners as spouses. If spousal and non-marital partners are counted together, the total number of sexual partners resident in the study area and within the eligible age range reported by males is 1484, the number reported by females is 1399, a 6% shortfall in the case of female reports. Since male participation rates are 9% lower than those of females, this suggests that the overall rate of under-reporting of recent sexual partnerships by women is of the order of 16%, even after allowing for miss-classification of non-marital partners as spouses, assuming that males do not exaggerate the number of sexual partners they report, and that non-participants have the same mean number of partners as participants.

However, the Kisesa community data allow us to say more about reporting errors than just the common observation of under-reporting by women. We have strong indications of selectivity in reporting of relationships by women – they are more likely to report partnerships with men with a higher perceived social status: those who are more educated and those who come from urban areas. On the other hand, under-reporting of sexual partnerships is more prevalent amongst younger rather than older women, and it seems likely that the partnerships that are most often not reported by these young women are those with older men.

We have discovered one way in which women may exaggerate the extent of their sexual involvement with men – they are more likely to report that a partnership that began a relatively long time in the past is still ongoing. This is particularly the case with partnerships with more educated men and men from outside the village. This exaggeration of the length of current partnerships may also stem from under-reporting of short-term relationships. A weakness of

these data is the lack of precise information on time of last coitus with each partner – this would furnish us with a more objective measure of the "ongoing" status of the relationship, and allow us to clarify the effects of the "wishful thinking" explanation (women's belief that their high status partners are still involved with them) and the "denial" explanation (women's refusal to admit to casual and short-term partnerships).

The data on HIV sero-positivity and sero-conversion indicate that male reporting on sexual behaviour is also unreliable. Although women under-report their sexual partnerships, they do so consistently, so that overall there is a strong association between reported number of partners and STD risk. But the lack of association between HIV incidence and numbers of partners for men could be an indication that male mis-reporting patterns are more complex than those affecting females. It is likely that some males exaggerate the total number of their sexual partners, or misdate their relationships, ascribing events that occurred a long time ago to the past year. The within-village analysis shows that the reports of partnerships by married men agree closely with women's reports of liasons with married men, whereas reports of partnerships involving single men are radically different. The comparison of reporting of prevalence, incidence and duration of partnerships also indicated more consistent reporting by married men than by single men. We can thus tentatively conclude that if there is some exaggeration in male reports of numbers of partners, then it is single men who are more prone to this type of miss-reporting than married men.

In summary, a population-based survey on sexual networking provides a wealth of data on partnership acquisition, concurrency, duration of partnerships, and sexual mixing by age, education and place of residence, which may help understand the spread of HIV and the design and implementation of interventions. Furthermore, a thorough analysis of male female aggregate data provides further insights into the magnitude of possible biases and how these

can change over time. Indeed, the study provides ample evidence that women are more secretive about their non-marital sexual behaviour than men, but this tendency is not universal or unqualified. Single women are more likely to under-report than married women, certain types of partnerships are more likely to be under-reported than others, and some single men have a tendency to swagger about sexual partnerships.

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Tables

Table 1 Non-marital partnership indicators, by sex and marital status

Sex of respondent	Respondent's marital status			
	Non-married	Monogamous	Polygamous	All
Partnerships in last year				
Men (N)	909	675	67	1651
Non-marital partners (mean)	1.61	0.73	0.51	1.21
Partnership overlaps (mean)	0.84	0.95	1.79	0.94
Non-marital partnerships (%)	71.4	41.3	34.3	57.6
Overlapping partnerships (%)	22.2	41.3	100.0	33.2
Women (N)	600	1127	306	2033
Non-marital partners (mean)	0.81	0.04	0.07	0.27
Partnership overlaps (mean)	0.15	0.04	0.08	0.07
Non-marital partnerships (%)	67.2	2.8	4.9	22.1
Overlapping partnerships (%)	5.3	2.8	4.6	3.8
Partnerships at survey				
Men (N)	909	675	67	1651
Non-marital partners (mean)	0.56	0.19	0.19	0.39
Partnership overlaps (mean)	0.45	0.19	1.31	0.34
Non-marital partnerships (%)	38.5	15.6	17.9	28.3
Overlapping partnerships (%)	11.7	15.6	100.0	16.8
Last partners continuing (%)	47.0	33.0	48.0	42.1
Women (N)	600	1127	306	2033
Non-marital partners (mean)	0.60	0.01	0.04	0.19
Partnership overlaps (mean)	0.03	0.01	0.04	0.02
Non-marital partnerships (%)	58.5	1.2	3.9	18.5
Overlapping partnerships (%)	1.3	1.2	3.6	1.6
Last partners continuing (%)	85.0	45.0	80.0	82.3

Table 2 Mean duration of non-marital partnerships (in months) by sex of respondent and continuation status of relationship (number of partnerships in parenthesis).

Order of partnership	Continuing	Ended	All
Men			
Most recent	7.3 (410)	1.3 (541)	3.9 (951)
Next most recent	4.1 (118)	1.3 (371)	2.0 (489)
Other partners	8.7 (121)	1.6 (429)	3.2 (550)
All partners in last year	7.0 (649)	1.4 (1341)	3.2 (1990)
Women			
Most recent	15.7 (369)	3.5 (80)	13.5 (449)
Next most recent	15.6 (13)	2.8 (51)	5.4 (64)
Other partners	2.5 (4)	1.1 (32)	1.3 (36)
All partners in last year	15.6 (386)	2.8 (163)	11.8 (549)

Table 3 Prevalence, incidence and duration of non-marital partnerships in the last year.

	Prevalence	Annual Incidence	Duration (in months)	Incidence x Duration	Ratio of Incidence x Duration to Prevalence
Men					
Single	0.39	1.61	4.1	0.55	1.4
Married	0.16	0.71	3.1	0.18	1.2
Women					
Single	0.59	0.81	12.6	0.85	1.5
Married	0.02	0.04	8.0	0.03	1.6

Table 4 Number of non-marital partnerships reported by men and women in the same villages by marital status of the respondent and the partner.

Respondent's marital status	Partner's marital status		
	Single	Married	All
Men			
Single	399	4	403
Married	99	6	105
All	498	10	508
Women			
Single	183	85	268
Married	7	16	23
All	190	101	291

Table 5 Age differences between respondents and their spouses and non-marital partners (male age - female age)

age group	Spouse			Partner		
	N	mean	(st dev)	N	mean	(st dev)
Men						
under 20	82	-0.9	(2.8)	531	0.7	(4.5)
20-30	261	4.5	(3.0)	1102	5.1	(5.3)
over 30	462	8.1	(4.7)	357	11.8	(5.9)
all ages	805	6.8	(4.6)	1990	5.1	(5.5)
Women						
under 20	169	7.0	(2.5)	214	5.3	(4.3)
20-30	648	7.1	(3.6)	227	6.0	(5.0)
over 30	622	7.6	(4.6)	113	6.4	(5.9)
all ages	1439	7.3	(5.1)	554	5.8	(5.0)

Table 6 Relative Risk of sero-positivity and sero-conversion by number of NMP

	Prevalence (age adjusted)			Incidence (before)			Incidence (after)		
Number of NMPs	N	OR	95% CL	N	OR	95% CL	N	OR	95% CL
Men									
0	488	1		309	1		243	1	
1	461	1.4	(0.8 - 2.4)	269	0.6	(0.1 - 2.3)	211	3.6	(1.1 - 11.4)
2+	484	0.9	(0.5 - 1.7)	281	0.4	(0.1 - 1.8)	213	3.3	(1.0 - 10.4)
Women									
0	1476	1		898	1		810	1	
1	384	2.0	(1.3 - 3.0)	183	2.8	(0.9 - 8.4)	156	3.2	(1.7 - 6.2)
2+	62	3.4	(1.6 - 7.4)	28	3.7	(0.4 - 29.9)	24	4.3	(1.2 - 15.4)

Figures

Figure 1 Percentage distribution of respondents by number of non-marital partners in last year by respondent's marital status and sex (number of respondents indicated within bars)

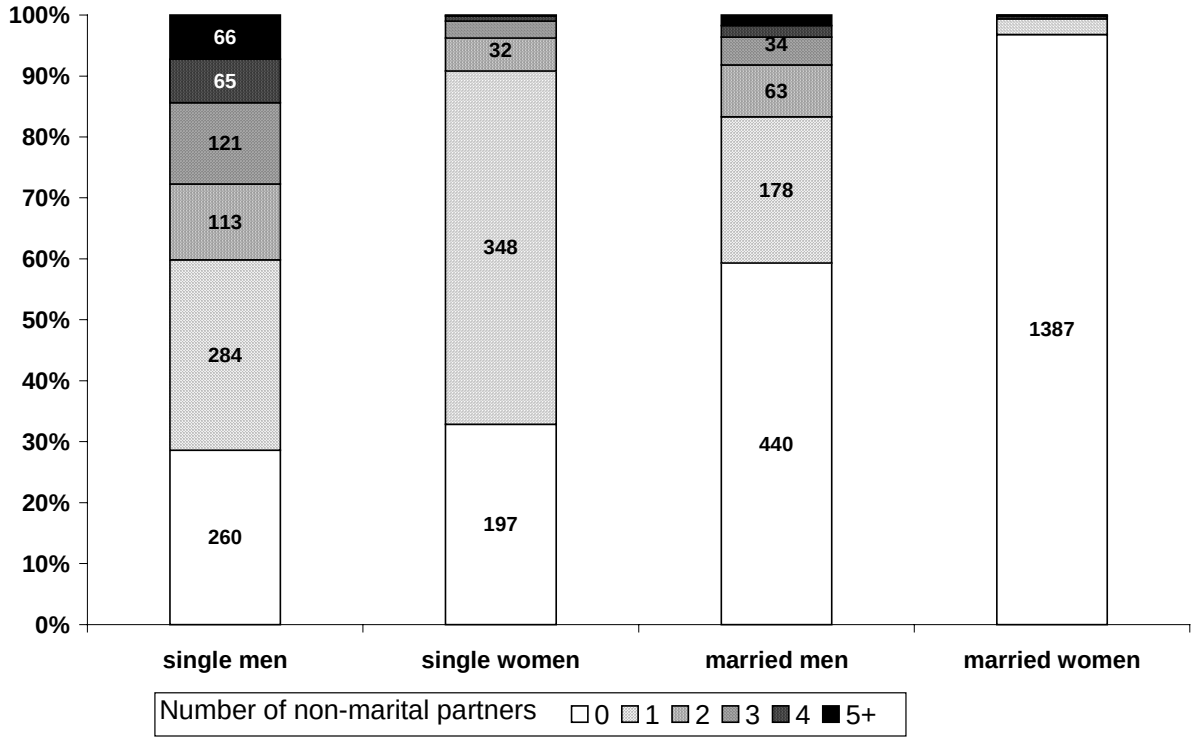

Figure 2 Age patterns of HIV prevalence and incidence