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SEXUAL BEHAVIORS RELEVANT TO HIV TRANSMISSION IN A RURAL AFRICAN POPULATION

HOW MUCH CAN A KAP SURVEY TELL US?

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Abstract—KAP surveys have been proposed as a means to gather quantitative information on AIDS-related sexual behaviors, but the validity of survey results has not been tested. The validity of data gathered during a KAP survey in a rural district in Northern Uganda ($N = 1486$) was examined analyzing expected behavioral patterns, agreement of partner reports, and concordance of number of sexual contacts across gender. *Patterns* of sexual behavior and age trends are as expected. More men (50%) than women (18.5%) reported premarital sex. The likelihood of sexual intercourse before marriage increases with age at first marriage and with education. Women marry 5 years earlier than men, and the number of marriages increases with age. Peak incidence of casual sex occurs before age 25. The male/female ratio of casual sex is 4, as compared to about 3 in other African surveys. Single men are 2.5 times more likely to engage in casual sex than married males. Agreement of *partner reports* was examined for 392 couples selected by chance. 86% of the couples agreed on being polygamous or monogamous. On average men reported 1.3 (SD = 0.7) wives as compared to women reporting 1.5 (SD = 0.89) wives ($P < 0.001$). 16.8% of women declared more, and 2.8% less cowives than their husband ($r = 0.65$). Self-reports on frequency of sexual intercourse in the past month were examined for 256 monogamous couples. Mean frequencies differ (5.24 ± 5.1 for men, 4.43 ± 4.7 for women, $P < 0.001$). 42.8% of couples are in agreement within ± 1 unit ($r = 0.44$). The *total number* of extra-marital and marital sex acts, as well as the total number of partners reported by each gender are similar. There is, however, a striking gender difference in reporting of casual partners in the past year. Data were found to be accurate at the aggregate level. However, accuracy of reporting at the individual level was found to be low. The gender difference in reporting of casual partners may be due to female underreporting, to not having captured prostitutes or to a different perception of the meaning of casual partnership. All KAP surveys should include a validity analysis, so as to provide a sense of the accuracy of the surveys and allow for comparison of the quality of different KAP surveys. There is an urgent need for a standardized approach to validating the findings from AIDS-related KAP surveys. Some of the indirect methods described here could be relevant for further use.

Key words—sexual behavior, KAP survey, validity, AIDS

1. INTRODUCTION

The importance of sexual contact among heterosexuals has been extensively documented as a major mode of HIV transmission in sub-Saharan Africa [1–5]. In the absence of efficacious vaccines, all interventions that seek to prevent the further spread of HIV infection have to focus on changing human behavior, and in particular, sexual behavior. More and better information on sexual behavior in defined communities is thus urgently needed, in order to determine the link between HIV prevalence and sexual behavior, to design effective interventions, and to evaluate their impact.

Prior to the recognition of the AIDS epidemic in the mid-1980s, two main types of research relating to human sexuality had been carried out in Africa. Firstly, patterns of sexuality in traditional societies were explored by ethnographic and social anthropological studies. This body of information was recently reviewed [6, 7], and provides valuable qualitative data that can be used as a starting point for designing quantitative studies. Secondly, in the 1960s and 1970s, as a component of worldwide population studies, knowledge, attitude and practice (KAP) surveys were undertaken to learn about the African perspectives on family planning services. The appropriateness of this type of survey, the quality of the data collected and the interpretation of results has been questioned [8–11], However, no methods to test the reliability and validity of the results were explicitly proposed or applied. In the 1980s, national fertility and family planning surveys were pursued in the form of Demographic and Health Surveys (DHS). The DHS surveys focus on female respondents and ask mainly questions about marriage, fertility, attitudes and behaviors regarding contraceptives and child health. They, thus, provide limited information on sexual behavior.

In the face of an AIDS epidemic that has been growing since 1986, KAP surveys have been proposed as a means to gather more and better information on AIDS-related issues, and particularly on sexual behaviors, in various population groups. The main

objectives of these surveys are to improve planning, implementation and evaluation of AIDS/HIV prevention programs. In order to standardize information collected during KAP surveys on AIDS, to ensure basic quality standards and to allow for cross-national and cross-cultural comparability, the Global Program on AIDS of the World Health Organization (GPA/WHO) developed a model survey instrument in late 1987 [12]. This GPA/WHO document provides useful guidance on research methodology, on the different aspects of field work and on how to analyze data collected. However, potential limitations relating to the reliability and validity of survey results are not explicitly considered. In a paper describing GPA/WHO's effort to develop research materials for identifying predominant patterns of sexual behavior in different social and cultural settings, the authors advocated face-to-face structured interviews as the most efficient research method [13]. However, they also stressed that, because of the highly private nature of sexual behavior, one should not solely rely on survey data. Use of secondary sources, application of a combination of different research methods in the same study population and methodological precautions (confidentiality, careful pre-testing of the instrument, avoidance of long recall periods and use of well trained interviewers) were proposed as means to improve data quality. Despite these precautions, however, some researchers still doubt whether standardized KAP surveys can provide data of reasonable quality, particularly on sexual behavior [14, 15].

Few KAP surveys on AIDS-related behaviors in Africa have been formally published to date. Most results have been presented at international conferences, seminars and in the form of reports [16–23]. Neither these, nor published papers [24, 25] have included a thorough discussion on the validity of the data collected, although most authors caution that their data should be viewed with care given the highly sensitive nature of the subject and the lack of verifiability of the findings.

It thus appears that although much research on sexual behavior is being carried out in Africa, little effort has presently gone into examining the quality of the data collected. As in any research endeavor, data collected are only useful to the extent they reasonably well represent what one tries to measure. Validation, the demonstration that a method measures what it is intended to measure, requires that the truth be obtainable. Given the private nature of human sexual behavior, it may be impossible to ever know the 'truth' at the individual level. But, accuracy of the research method at the individual level may not be essential in order to produce useful results. As we are concerned with patterns of sexual behavior and their change over time in a defined community, correct classification of individuals into relevant categories may be a more realistic goal. As subjective self-reports of sexual behaviors cannot be validated by comparison to objective, independent measurements, indirect approaches to validation should be employed [26, 27].

In this paper we examine possible means of indirect validation of data collected during a KAP survey in a rural area in northern Uganda. Sexual behavior relevant to HIV transmission is divided into three categories: premarital sex, marriage and extra-marital sex. Several indirect methods are used to validate the results. (1) Data on sexual behavior are examined for expected patterns and trends to assess construct validity. (2) Results of the survey are compared to findings from similar surveys in Uganda and sub-Saharan Africa as an external validity check. (3) Internal validity is assessed by examining the agreement of partner reports and the concordance of number of sexual contacts in the male and female population. (4) A specific threat to instrumental validity in this study relates to male interviewers questioning female respondents. As this situation is not unique given the lack of qualified female interviewers, possible biases due to males interviewing females will also be examined. (5) Qualitative information gathered in the same sample population through group discussions and in-depth interviews are used to provide background information on sexual behavioral patterns. Finally, a more systematic approach to validating sexual behavioral data in AIDS-related KAP surveys will be proposed.

2. METHODS

Moyo district is a remote rural area in the North-West of Uganda, bordering on Sudan and effectively divided into two parts by the Nile river. It is currently inhabited by an estimated population of 150,000 Ugandans. Since March 1989, about 50,000 Sudanese refugees have migrated to East Moyo, increasing the overall population of the district to about 200,000. The main languages spoken are Madi and English.

Between January and March 1991, a representative sample of the adult population of the district was interviewed to assess current knowledge about AIDS, attitudes towards preventive measures, patterns of sexual behavior and presence of risk-factors for the transmission of HIV infection. This study was planned as the initial phase of a comprehensive AIDS control program in Moyo district.

2.1. Study sample

A three-stage cluster sampling procedure (parish, village, household) was applied to select 800 households. Eight parishes and 39 villages were randomly chosen with probability-proportional-to-size. Twenty households were randomly selected after complete enumeration in each village. In each household, if possible, one man and one women in the 15–49 age range was randomly selected and interviewed. Only

10 people (0.7%) refused to be interviewed. In 9% of the households only one person was eligible for interview due to the eligibility criteria. A total of 1486 interviews were completed.

2.2. Questionnaire

The questionnaire used in this survey is a modified version of the GPA/WHO 'model' KAP instrument. Information gathered through preliminary group discussions and individual interviews in the survey area was used to identify gaps and redundancies in the WHO questionnaire, given local conditions, and to define critical terms in the local language, such as marriage, regular partner, casual partner, prostitutes, condoms. The draft questionnaire was then revised several times by Ugandan colleagues, as well as by social scientists from the Social and Behavioral Research Unit of the Global Program on AIDS, WHO. After completing the English version, the questionnaire was first translated into Madi, the local vernacular, and then independently translated back into English. Differences between the original and second English version were carefully examined and corrected. The questionnaire was then translated again into Madi by three different persons. A group of four persons, who are fluent both in Madi and English, compared the resulting translations and agreed on the final version of the questionnaire in Madi. The Madi translation was then introduced into the English questionnaire, each question being written in English and Madi. This seemed the best approach as some people in the district do not speak Madi, and as Madi, traditionally, is not a written language.

Pretesting of the questionnaire was carried out in one village that had not been selected for the survey. Some minor errors were detected during the pretest and were subsequently corrected in the questionnaire by the interviewers. One major problem appeared during the pretest: questions about sexual practices should have started by enquiring about the marital status and age at marriage before asking about previous sexual intercourse and age at first sex. Female respondents were particularly sensitive to the order in which the questions were asked. Consequently the interviewers always resequenced the questions asking first about marriage and subsequently sexual practice.

2.3. Data collection

Twenty interviewers were recruited in Moyo district. Their characteristics were fluency in English and Madi, secondary school education, age 25 years or above, married with previous work experience. Unfortunately, it proved difficult to find women who fulfilled these requirements and were searching for work. Sixteen men and four women were selected and followed a two-week training course. During the training, six of the male interviewers chose freely to be assigned as 'women interviewers' Due to the lack of female interviewers, this seemed the best solution for guaranteeing that those men who had to interview women would feel comfortable in doing so.

During the fieldwork, the 20 interviewers were split into two groups of 10 each. Each group had to cover four parishes. Each team surveyed one village a day, which meant four interviews per person per day. Great attention was paid to ensuring a non-judgmental attitude of the interviewers and total confidentiality. The questionnaires were reviewed daily, in the village where the interviews had taken place, by the supervisor of each team. Major errors were corrected by the interviewer returning to the interviewee.

In addition to the questionnaire-based survey, one village was purposefully chosen in each parish for in-depth interviews and group discussions. In each village, four in-depth interviews with village leaders were conducted in English by the supervisors, and two group discussions were conducted by the interviewers in Madi, in separate locations for women and men. Notes were taken during in-depth interviews and group discussions. The latter were also tape recorded.

2.4. Data management and analysis

Data were entered on two portable computers using EPIINFO by three persons, the two supervisors and one Ugandan computer technician, on a daily basis. Range and skip checks were done automatically during data entry. Logical and consistency errors were checked after completing data entry for each parish. Any errors identified at that stage were corrected after revision of the original questionnaire. The clean data file was transferred to a SAS data file. All subsequent analyses were done in SAS-PC. The χ^2 test was used for analysis of proportions, the t-test for analysis of means, and the paired t-test to compare means. Trends were analyzed with the Mantel–Haenszel χ^2 statistic (proportions) and the Pearson correlation coefficient (ordinal data). The Cochran–Mantel–Haenszel statistic was used for stratified analyses of association.

Material gathered in group discussions and in-depth interviews was compiled, and tape recordings were transcribed into Madi and translated into English. The results have not been formally published.

2.5. Data sources for external validation

The Uganda demographic and health survey was carried out in 24 districts in 1988/89 [28]. Nine northern districts were not surveyed due to security reasons. The sample covered 4730 women aged 15–49. Results were used for comparison of marriage patterns. In 1989 the WHO KAP survey instrument was pretested in Uganda [29]. Three hundred households were surveyed and 255 respondents interviewed. Data on intra-marital sexual activity were

Table 1. Sociodemographic characteristics of the study population

		Women ($N = 753$)	Men ($N = 733$)	All ($N = 1486$)
Average age (in years):		26.7	30.4*	28.5
Education:	Higher	8.7%	35.1%*	21.7%
	Primary	54.7%	54.0%	54.4%
	No school	36.6%	10.9%*	23.9%
Literacy:	English	29.5%	67.1%*	48.0%
	Madi	44.2%	80.4%*	62.1%
Marital status:	Currently married	82.3%	75.7%	79.1%
	Formerly married	8.2%	4.8%	6.5%
	Never married	9.4%	19.5%*	14.4%
Travel:	Traveled past year	5.8%	19.8%*	12.7%
	Mean number of days	78.7	62.2	65.9
	Median number of days	30.0	28.0	28.0

*Gender differences statistically significant at $P < 0.0001$.

Table 2. Proportion of respondents who had premarital sex and find premarital sex acceptable by age and gender

	Women ($N = 753$)			Men ($N = 733$)		
Age	Had premarital sex (%)	Accept for women (%)	Accept for men (%)	Had premarital sex (%)	Accept for women (%)	Accept for men (%)
15–19	6.3	2.4	1.6	26.8	11.0	13.4
20–24	22.7	5.4	8.8	57.7	20.4	21.3
25–29	24.2	3.9	6.6	49.3	13.1	15.3
30–39	20.5	4.6	8.5	56.1	19.8	21.3
40–49	7.8	0.0	1.6	45.7	12.3	12.3
Total	18.5	3.9	6.4	49.9	16.3	17.6

Kappa statistic (measure of agreement adjusted to that expected by chance) for having had premarital sex and finding it acceptable: for women 0.19 (acceptable for her) and 0.17 (acceptable for him) for men 0.23 (acceptable for him) and 0.17 (acceptable for her). This represents poor agreement in all cases.

compared. Several national KAP surveys have been conducted in Africa under the auspices of GPA/WHO. Complete results of these surveys have not yet been formally published. Selected findings on sexual behavior have been recently reported [30], and were used for external validation of marital age trends and gender-specific patterns of extra-marital sex. Comparing self-reports on the frequency of sexual intercourse of two regular sexual partners to assess the accuracy of reporting was first used by Kinsey and his colleagues in 1948 [31]. Correlation coefficients, means and standard deviations of spousal reports, as well as the proportion of spousal pairs who were in perfect agreement and within ± 1 unit were used to validate their results. More recent studies have also used spousal reports for validation purposes, although not providing as much detail as Kinsey [32]. In the absence of similar data from Africa, the degree of internal concordance of partner reports in Moyo was compared to results of these studies.

3. RESULTS

Of the 1486 persons interviewed, 753 (50.6%) were women and 733 (49.4%) men. Table 1 shows the distribution of sociodemographic variables by gender. Age, educational level and literacy rate were higher among men than women. Men were more likely to be single and more likely to have traveled.

3.1. *Premarital sex**

Women had their first sexual experience on average at age 17, and men at age 19. Only 18.5% of women as compared to 50% of men report premarital sexual experiences. This gender difference holds across all age groups (Table 2), and is associated with a different time span between first sex and first marriage for males and females. Women marry on average 6 months after their first sexual experience, whereas men marry 3 years after ($P < 0.0001$).

Expected trends and patterns. The gender difference in reporting premarital sex may be related to the social acceptability of having sexual experiences before marriage. Table 2 shows that female respondents are much less tolerant than men regarding premarital sex for *both*, men and women, and that respondents age 15–19 and age 40 and above are less permissive than younger respondents. The age and gender pattern of premarital sexual experience and its acceptance are thus similar. There is, however, a big gap between the proportion of respondents finding premarital sex acceptable and those reporting premarital sex. In each age group a much higher number of men and women had sex before marriage as compared to the number finding this behavior acceptable for their own or the other gender.

*Premarital sex was defined as sexual intercourse before the first marriage. Single respondents who reported having had sexual intercourse were considered as having had premarital sex.

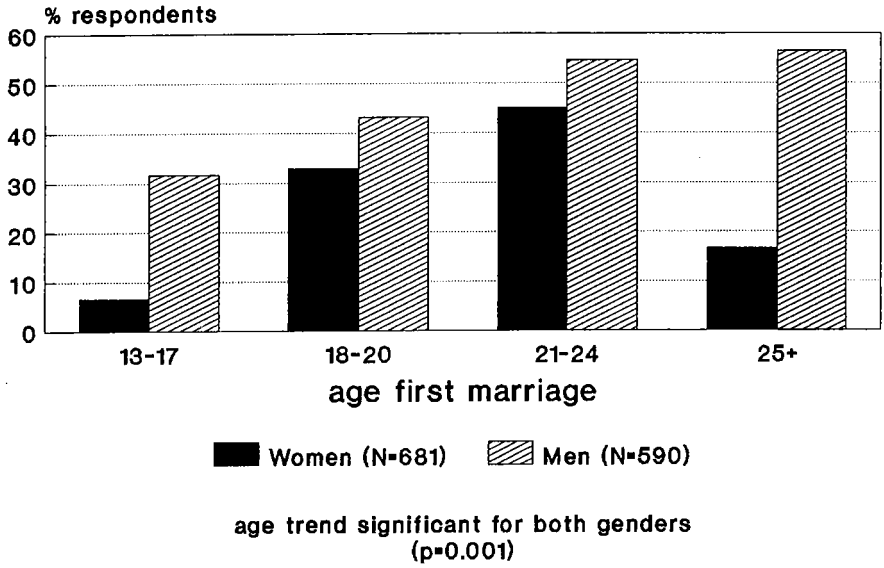

Fig. 1. Premarital sex by age at first marriage (only ever married respondents).

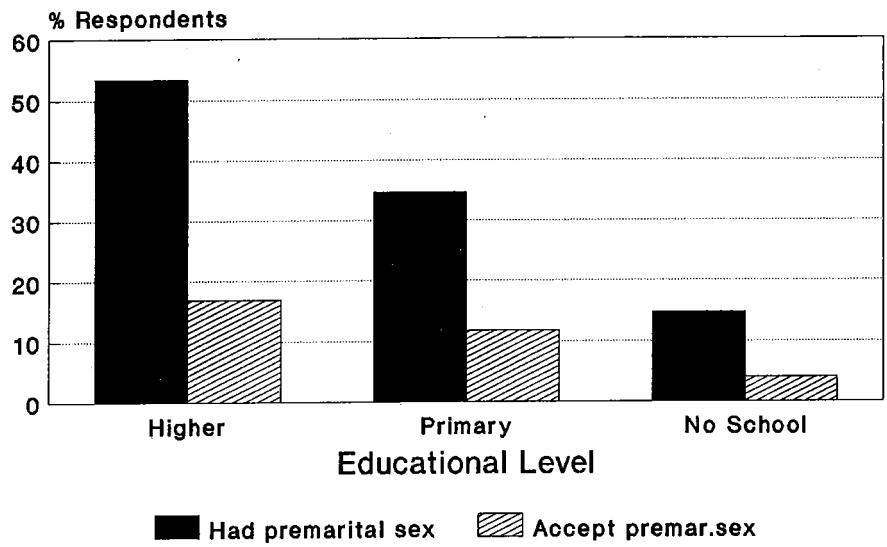

Fig. 2. Reporting and acceptance of premarital sex by educational level.

It can be expected that age at first marriage will influence premarital sexual experience. In fact, the older the respondent is at his/her first marriage, the more likely he/she is to have had sexual intercourse before marriage (Fig. 1). This holds across gender except for the 6 women who married after age 25.

*Marriage is sanctioned once the full bride price has been paid. Due to economic hardship in Moyo district and high bride prices, it is very difficult for young men to pay the full price. Often only part of the bride price is paid at the time when the couple starts to live together. At that point the couple is, however, considered to live in a marital relationship.

External comparison. In other KAP studies [33, 34] acceptance and reporting of premarital sex have been shown to increase with educational level. This tendency was confirmed in Moyo (Fig 2). For both men and women, premarital sex is significantly associated with educational level across all three categories ($P = 0.002$), whereas acceptance of premarital sex only relates to having received any school education vs no schooling ($P = 0.0001$).

3.2. *Marriage**

On average, women marry at age 17.5, 5 years earlier than men. Almost all women (96%) have lived in a marital union before age 25, but only 59% of

Table 3. Number of marriages by age and gender (proportion of respondents 'ever married')

	Number of marriages							
	Women				Men			
Age	1 (%)	2 (%)	3 (%)	4+ (%)	1 (%)	2 (%)	3 (%)	4+ (%)
15–19	95	4	0	0	85	15	0	0
20–24	84	16	0	0	81	17	0	1
25–29	65	34	1	0	66	23	7	4
30–39	61	35	3	1	47	28	14	11
40–49	59	32	10	0	27	28	28	17

Age trend statistically significant for both genders ($P = 0.000$).

the men. On average, men have contracted 1.9 marriages during their life-time as compared to 1.3 marriages for women. Overall 21% of men and 36% of the women say that they are currently living in a polygamous relationship. On average, male respondents living in a polygamous union report having 2.4 wives (SD = 0.76). Women, whose husbands are polygamists, declare on average having 1.5 cowives (SD = 0.79) in addition to themselves.

Expected trends and patterns. As would be expected the number of marriages increases with age for both sexes (Table 3). The trend is more pronounced in the male population, as the overall number of marriages is higher, due at least partly to polygamy. A man will only be able to afford a second and possibly third wife a number of years after his first marriage, and will then marry a woman who is much younger than himself. This is reflected in a high percentage of women living in a polygamous union at young ages (30% at age 20–24 as compared to 13% of males in the same age group).

Twenty-six percent of married women and 17% of married men had no sex with their spouse(s) in the past 4 weeks. The reasons given for sexual abstinence were pregnancy or recent delivery of the woman, and prolonged absence of the partner from home. Sexual abstinence after delivery seems to be the rule. Ninety-three percent of female respondents and 84% of male respondents stated that women abstain from sex after childbirth for, on average, 3.7 months (SD = 2.7). Absence from home is related to travel outside the district, to funerals and, for polygamous men, to living temporarily with another wife. Examining answers given by couples it appeared that the odds of having had sex with the husband in the past month are 1.75 times higher for women living in a monogamous relationship than for those whose husband is a polygamist.

External comparison. Comparing these results to those of other surveys on sexual behavior in Africa [35] reveals that age trends and marriage patterns are similar. Aggregating data for both genders, age at first sexual intercourse has decreased over time and is lower than age at first marriage (Table 4). First sexual intercourse is experienced later in Moyo than reported in the national KAP surveys from other countries. This may be due to the fact that data from the three African countries shown here aggregate urban and rural behaviors. Examining data for women only, median age at first marriage is 17 years in both Moyo and the rest of Uganda [36] and has not significantly changed over time ($P = 0.18$ for both).

Polygamy was found to be equally prevalent in Moyo and in the rest of Uganda across all age groups ($P = 0.85$), and to increase steadily up to age 29 ($P = 0.001$) (Fig. 3).

Comparing intra-marital sexual activity as described in the pilot test of the Ugandan national KAP survey [37] to data from Moyo, we found that, although the patterns are not identical, there is no statistically significant difference ($P = 0.74$). In both surveys, a considerable proportion of respondents did not have sex with their regular partner in the past month and few people had sexual intercourse more than 16 times (Fig. 4).

Internal concordance. The external comparisons above show that our data describe the expected general marriage patterns and age trends. This seems to validate the results at the aggregate, community level, but does not allow us to draw conclusions on the validity of individual reports. To assess the accuracy at an individual level, we examined answers given by spouses.

Table 4. Mean age at first sexual intercourse and mean age at first union restricted to 'ever married' respondents, by current age of respondent: comparing national data from three African countries and results from the KAP survey in Moyo district

	Central Afr. Republic ($N = 1504$)		Ivory Coast ($N = 2432$)		Kenya ($N = 1909$)		Moyo ($N = 1271$)	
Current age	Age sex	Age union	Age sex	Age union	Age sex	Age union	Age sex	Age union
20–24	16.2	17.2	15.8	16.8	16.2	18.6	17.2	18.3
SD	2.3	2.3	2.3	2.8	2.5	2.6	2.2	2.3
25–39	16.9	18.7	16.2	18.3	16.9	20.9	18.3	20.2
SD	2.9	4.1	2.3	4.6	3.1	4.2	3.4	3.8
40+	17.8	20.9	17.2	20.2	17.9	21.8	20.3	22.4
SD	3.5	5.8	4.3	6.5	3.6	5.8	4.5	4.9

Statistically significant influence of current age on age at first sex ($P = 0.025$) and age at first union ($P = 0.001$), and of country of origin on age at first sex ($P = 0.025$) and age at first union ($P = 0.01$). No interaction between country of origin and current age ($P > 0.1$) in either case. Data from Caraël, Cleland, Adeokun (Ref. [19]).

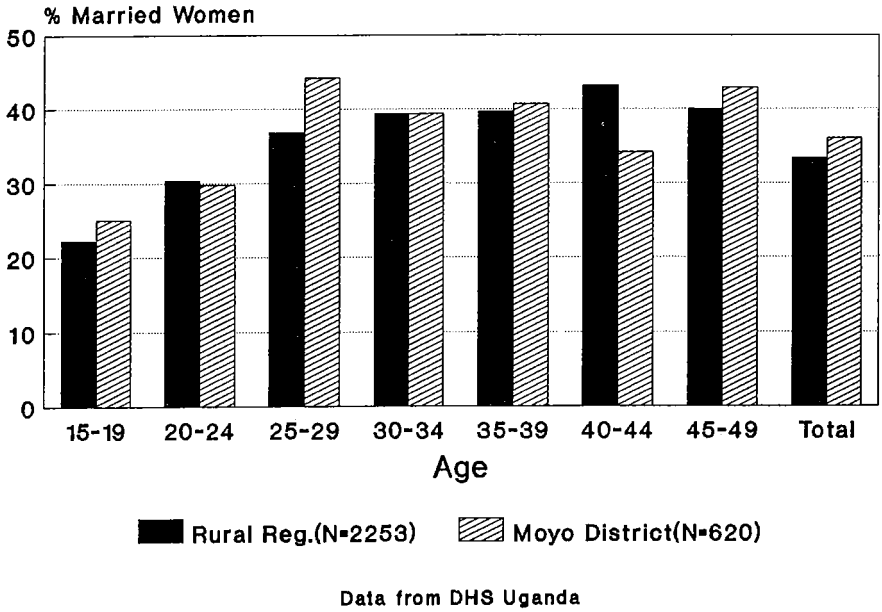

Fig. 3. Women in polygymous union by age. Comparing rural regions and Moyo.

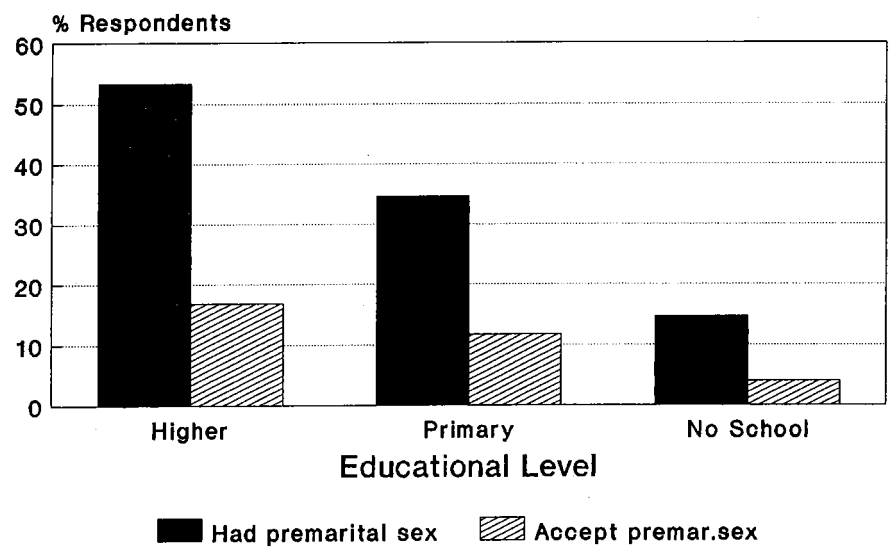

Fig. 4. Reporting and acceptance of premarital sex by educational level.

During the survey, 392 couples* were interviewed. In 66% of the couples, both partners said they were living in a monogamous relationship. Twenty percent declared unanimously being part of a polygamous marriage. However, in 12% of the couples, the woman reported having cowives, but the husband considered himself monogamous. In 2%, the man declared polygamy, but his wife reported a monogamous marriage. The Kappa statistic† is 0.65, representing good overall agreement.

On average, men reported 1.3 (SD = 0.7) wives and women reported 1.5 (SD = 0.89) wives (number of cowives plus herself).‡ About one-fifth of the couples gave discordant answers on the number of wives. 16.8% of the women declared more, and 2.8% less cowives than their husband. The correlation coefficient for the number of wives is 0.65 ($P < 0.0001$).

*In each of the 800 households chosen for the survey, two adults were randomly selected. The interviewers noted after leaving the household if, by chance, husband and wife had been selected for interview.

†Measure of agreement adjusted to that expected by chance.

‡Difference in mean number of wives statistically significant at $P < 0.001$.

Table 5. Validating self-reported sexual behavior by comparing reports of sexual partners on frequency of sexual intercourse

Study	Number of couples	Time unit	% Identical responses	±1 unit (%)	Coeff. Correl.	Mean Husband	Mean Wife
Moyo	256	month	26.7	42.8	0.44	5.24 ± 5.1	4.43 ± 4.7*
(1)	231	week	56.6	88.1	0.60	1.91 ± 0.11	2.21 ± 0.13*
(2)	428	month	—	—	0.57–0.61	—	—
(3)	60	month	—	—	—	6.96	7.78
(4)	4250	year	—	—	0.78–0.87	—	—

*Difference in mean reported by wife and husband is statistically significant ($P < 0.001$).
(1) Kinsey *et al.* [31, p. 125] "allowance must be made for the possibility that there may have been collusion between some of the partners, and a conscious or unconscious agreement to distort the facts."
(2) Clark and Wallin (1964). *Average* number of sexual contacts per month over the past year was asked.
(3) Levinger (1966). "*Ordinarily*, how many times a month have you had sexual relationships with your spouse?"
(4) Blumstein and Schwartz (1983, 1989). Respondents had to choose a category of frequency of sexual intercourse over the past year.

The major disagreement seems to arise from women overreporting cowives or men underreporting the number of wives. This could be partly due to a different definition of wife/cowife by male and female respondents.

Wives could, for example, consider regular partners* of their husband as cowives. However, when regular partners reported by the husband were included in the analysis, the percent of couples disagreeing on the number of wives did not change (19.6% increased to 20.5%).

On average, married women reported 3.7 sex acts (SD = 4.2) with their spouse during the last month, whereas married men reported 5.7 sex acts (SD = 5.7) with their spouse(s). This difference may be explained by the fact that about one-fifth of the men have more than one wife.

In order to validate the self-reported number of sex acts with the spouse at the individual level, we compared self-reported frequency of marital sexual intercourse in the past 4 weeks among the 256 couples who declared themselves unanimously to be monogamous. Table 5 summarizes the results of the Moyo KAP survey regarding accuracy of self-reported frequency of sexual intercourse with the spouse in comparison with relevant U.S. studies. With the exception of the Kinsey study, correlation coefficients relate to average monthly frequency or categories of monthly frequency of sexual contact. This makes comparison with our study difficult as the concordance in exact numbers of reported sexual contacts over the past 4 weeks was examined. Kinsey tested agreement on the number of sexual contacts, but only during the past week. The longer recall period in our study may partly explain the lower correlation coefficient. It also appears that the variability of the number of contacts is much higher in Moyo (SD = mean) than in the U.S. couples interviewed by Kinsey (SD = 0.05 × mean).

It is very difficult to draw conclusions from this comparison as the questions asked, the type of information reported and the analyses vary considerably. To our knowledge, the concordance of a couple reports on frequency of sexual intercourse has not been reported in any of the studies on sexual behavior carried out in developing countries, and in particular in Africa.

3.3. *Extra-marital sex*

Extra-marital sex or casual sex was defined as any sexual relationship with a person not identified as the regular partner or spouse. Questions were asked on the number of casual partners in the last month (February 1991) and last year (calendar year 1990), as well as number of sex acts in the past month. Some respondents reported casual sex in the past year, but not the past month and vice-versa. Overall, 2.5% of persons interviewed said they had casual sex in the past month (1.6% of women and 4.1% of men), and 5.8% in the past year (2% of women and 15% of men).

Expected trends and patterns. For both genders, peak incidence of casual sex was reported before age 25. A much higher proportion of men than women report casual relationships in all age groups (Table 6). According to qualitative information from the survey area, men are freer than women to choose their sexual partners at any stage in life and regardless of their marital status. Women are expected to be faithful to their regular partner, and to limit premarital sex to the man who will eventually become their husband.

Table 6. Proportion of all respondents reporting casual sex in the past year (including past month) by sex, age and marital status

	Women ($N = 753$)		Men ($N = 733$)	
	(%)	(*n*)	(%)	(*n*)
*Age**				
15–19	3.2	(4)	13.4	(11)
20–24	2.9	(6)	19.0	(26)
25–29	1.7	(3)	9.5	(13)
30–34	1.8	(2)	9.7	(13)
35–39	1.5	(1)	11.4	(12)
40–45	0.0		1.6	(1)
45–49	0.0		2.6	(2)
*Marital status***				
Never married	11.3	(8)	20.3	(29)
Currently married	0.5	(3)	7.7	(43)
Formerly married	8.1	(5)	17.7	(6)
*Total****	2.1	(16)	10.6	(78)

*Trend significant for men ($P = 0.000$), but not for women ($P = 0.1$).
**Trend significant for men and women ($P = 0.000$).
***Gender difference significant controlled for age ($P = 0.000$) and for marital status ($P = 0.000$).

*Any person with whom the respondent has a stable relationship and has lived or intends to live together for more than a year.

Table 7. Proportion of sexually active male and female respondents reporting casual sex in the last year by marital status: comparing data from selected African countries and Moyo district

	Central African Republic ($N = 1250$)	Ivory Coast ($N = 2157$)	Kenya ($N = 1304$)	Moyo ($N = 1354$)
Men				
Single(*)	17	83	56	20
Married	14	46	26	8
S/M	**1.2**	**1.8**	**2.2**	**2.5**
Women				
Single	7	62	21	11
Married	5	16	4	1
S/M	**1.4**	**5.2**	**5.3**	**11**

Data from Carael, Cleland, Adeokun (Ref. [19]).

Table 8. Number of sexual partners and sex acts reported per 100 respondents

	All respondents			Excluding respondents who traveled		
	Women	Men	M/W	Women	Men	M/W
Marital sex acts past month per 100 respondents	299	428	1.4	302	425	1.4
Casual sex acts past month per 100 respondents	6	5.5	0.9	4	6	1.5
Sex partners past year per 100 respondents	84	121	1.4	85	115	1.4
Casual sex partners past year per 100 respondents	2	21	10.5	2	19	9.5

However, divorced or separated women are granted more sexual freedom. The results shown in Table 6 seem to reflect these social rules. Those who were previously married report far more casual sexual activity than those who are currently married.

It is interesting that a relatively high proportion of single women reported casual sex, although this does not conform to social expectation.

External comparison. Comparing our data on extramarital relationships to results of other KAP surveys reveals that the proportion of married women reporting casual sex in the past year is particularly low in Moyo as compared to other African settings (Table 7). The overall male/female ratio of casual sex is four in Moyo and thus higher than in other African countries where it is about three. Some underreporting, particularly by married women, cannot be excluded. It should, however, also be considered that the data from other African countries aggregate urban and rural populations.

The general trends, however, are similar, namely that a higher proportion of single men and women as compared to married respondents engage in casual sex, and that women are less prone to casual sex than men, whatever their marital status.

Internal concordance. If reporting by men and women were 'true' the overall number of sex acts declared by each gender should be similar. This holds only if no sexual activity takes place outside the district. As we have no information on the location of sexual activity, we compared the numbers provided by women and men for all respondents and for those who did not leave the district during the past year. As shown in Table 8, the number of extramarital* and marital sex acts, as well as the total number of partners reported by each gender are similar. There is, however, a striking gender difference in reporting of casual partners in the past year. This could be due either to underreporting by women, or to the existence of a prostitute population that was not captured by the survey, or to a combination of both. A further indication towards underreporting in women is the similar frequency of casual sex reported in the last month (1.6%) and in the past year (2%), as compared to 4.1% and 15%, respectively, in men.

3.4. *Men interviewing women*

During the training, 6 of the male interviewers had freely agreed to being assigned as 'women interviewers'. They did not report nor did the supervisors observe any problems during the survey. None of the female respondents refused to be interviewed by a man, and the women apparently did not resent being interviewed by men on such delicate subjects as sexual practices and condoms. However, a difference in women's answers to the questionnaire according to the sex of the interviewer cannot be excluded directly. In order to examine this possible threat to instrumental validity, results obtained from women interviewed by women were compared to those interviewed by men (Table 9). There is a significant difference in reporting of casual sex in the past month, but not in the past year, suggesting underreporting of women interviewed by men. However, controlling for the differences in age and in the proportion never married among the two groups, the difference in reporting of casual sex in the past month is no longer significant ($P = 0.087$). The differences in reporting of 'no sex

*Only 29 out of 40 respondents having had casual sex, provided information on the precise number of sex acts with casual partners. It is difficult to draw any firm conclusions, as the numbers are very small.

Table 9. Answers given by women according to the gender of the interviewer

	Gender of interviewer	
	Female ($N = 282$)	Male ($N = 471$)
Higher education	8.9%	8.5%
Never had sex	6.7%	8.7%
Never married	12.4%	5.7%*
No sex during past year	20.8%	14.4%*
No sex with regular partner during past month	25.5%	27.0%
Casual sex in past year	1.2%	1.9%
Casual sex in past month	3.2%	0.9%*
Know about condoms	25.9%	26.5%
Want to use condoms	13.7%	33.1%*
Experienced STD in past year	7.1%	4.3%
Mean age	27.6 years	26.2 years*
Mean age at first sex	17.1 years	16.7 years
Mean age at first marriage	17.3 years	17.4 years
Mean number of cowives	1.3	1.6
Average number of sex acts with regular partner in past month	4.4	3.3

*Differences are statistically significant ($P < 0.05$).

during past year' and in 'wants to use condoms' however, remained significant when controlling for age and 'never married' ($P = 0.018$ and 0.005, respectively). If these differences were to be attributed to the gender of the interviewer, one may conclude that women interviewed by men were overstating or more willing to report their sexual activity and their willingness to use condoms, as compared to women interviewed by women.

4. DISCUSSION

Using indirect methods to validate data on sexual behavior collected during a KAP survey in one district in Northern Uganda reveals several issues. (1) Expected patterns of sexual behavior and marital union, as well as time and age trends, are coherent with qualitative information gathered in the survey area and are comparable to findings from other surveys in Uganda and Africa. (2) Social norms could be expected to bias reporting, particularly in sensitive areas such as premarital and extramarital sex. However, two findings give evidence to the contrary. Firstly, only one-tenth of respondents find premarital sex acceptable, but a third of the interviewees acknowledged having had sexual intercourse before their first marriage. Secondly, 11% of single women reported having had casual sex, although this goes against social expectations in Moyo. (3) A major validity threat identified in the analysis relates to reporting of casual sex by women. The pattern of casual sex as related to marital status of the woman is consistent with qualitative information from the survey area and with data from similar surveys in Africa. However, the overall number of casual partners seems to be extremely low. Reporting and interviewer bias may partially account for this. However, another possible explanation is the low probability that a prostitute would be captured by a household survey. This may be due to prostitutes living in specific areas that are not randomly distributed and thus undersampled, and to the fact that prostitutes are highly mobile. In our sample only one woman reported more than two casual partners in the past month. (4) On the aggregate level data on marriage and marital sex are concordant with qualitative information and findings from other surveys. However, analysis at the individual level revealed two gaps. Firstly, couples do not agree unanimously on living in a monogamous or polygamous relationship, and women report more cowives than their husbands declare wives. Secondly, agreement on the precise number of marital sexual contacts in the past month among monogamous couples is relatively low, although they report a similar average number of contacts. (5) Reporting of sexual activity and willingness to use condoms may have been biased due to men interviewing female respondents.

As similar analyses regarding the validity of results on sexual behaviors gathered through KAP surveys in Africa have not yet been published, it is difficult to assess the extent to which the validity threats identified here are unique to the Moyo survey or reflect a more general situation. It is clear, however, that some of the issues described above relate to inherent shortcomings of the KAP method in exploring sexual behaviors. The intimate nature of sexual activities renders validity proofs by comparison to a 'gold standard' impossible. Validity checks will always be by proxy measures and thus incomplete. KAP surveys attempt to quantify behaviors that are 'subjective' and depend on a common understanding of terms that may be difficult to define exactly. It is difficult to assess if and how social norms and pressures may bias reporting, and how this bias could be corrected or accounted for. Finally, household surveys that are the sampling unit of most KAP surveys, may not accurately reflect casual sexual activity, as prostitutes are not captured in a representative manner.

In light of the findings presented here, we suggest that there is an urgent need for a standardized approach to validating the findings from AIDS-related KAP surveys. Some of the indirect methods

described here could be relevant for further use. (1) Concordance of numbers of regular and casual partners and sex acts across gender can be used to identify gaps. (2) The agreement of answers given by couples on type of union (mono/polygamy), on number of wives and on number of sex acts with the spouse measure accuracy of reporting at the individual level. (3) Age and time trends and behavioral patterns should be examined in the light of qualitative information from the same area and be compared to results from other surveys in the same country or region. Possible validity threats that are identified, should be acknowledged and commented upon.

Moreover, it would be worthwhile to repeat measurements of sexual behavior questions, to get some information on the reliability* of answers provided. A review of surveys on sexual behavior in the U.S. that included repeated measurements revealed substantial levels of consistency between answers to questions about sexual behavior obtained at two different points in time [38], the interval between test and retest varying between 24 hr and 4 months. Unfortunately, test–retest reliabilities have not been examined in any of the surveys on AIDS-related behaviors in developing countries. It may be difficult to do this in all KAP studies. However, given the fact that the standardized WHO model questionnaire has already been developed and field-tested, the test–retest reliability of some of the sensitive questions of this instrument could be examined in some pilot areas as a separate research project.

The results of AIDS-related KAP surveys are being used at least in two ways, to provide relevant information for policy decisions and planning of AIDS interventions, and to provide baseline data for evaluating the impact of such interventions. For policy and planning purposes, data that 'truly' reflect reality at the community level may be all that are needed. A higher accuracy at the individual level may be needed to satisfy the requirements of impact assessment.

All KAP surveys should include a validity analysis, so as to provide a sense of the accuracy of the surveys and allow for comparison of the quality of different KAP surveys. If planners and evaluators are satisfied with the accuracy of the results obtained by the current KAP method, a standard quality measure should be defined. If the accuracy of KAP data appears to be insufficient, more in-depth research will be needed to improve the KAP method itself and/or to design other research methods.

Given the importance of collecting information on sexual behaviors through AIDS-related KAP studies and the unique opportunity for obtaining this information through standardized national and regional surveys, strong efforts should be made to identify validity threats and, consequently, to improve data collection methods.

*Reliability is defined as the extent to which a measuring procedure yields the same result on repeated trials, and depend on the quality of the survey instrument, the way in which the questionnaire is administered and the 'truthfulness' of the respondents' answers.

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