

Do third-party reports improve the measurement of sensitive behaviors? A validation study using social network and HIV biomarker data

James Mkandawire, Stéphane Helleringer and Hans-Peter Kohler

Extended abstract – Do not cite, do not circulate

Sensitive and stigmatizing behaviors that put people's health at risk are notoriously difficult to measure during surveys [1]. Survey respondents, for example, under-report the extent to which they smoke [2, 3], drink [4] or have sex [1]. This presents numerous challenges for the design and evaluation of interventions aimed at reducing the risk of acquiring sexually transmitted diseases (including HIV) or the frequency of adverse reproductive health outcomes. Various methodological innovations have been proposed to solve this problem including computer-assisted self-interviewing [5-8], confidential voting techniques [9] or the use of life-history calendars [10]. Whereas some of these attempts have succeeded in eliciting higher levels of reporting of sensitive behaviors, this is not always the case. A systematic review of survey administration techniques [11] indicates that improvements are only marginal, depend on the interview context and may be much more limited among the least educated. In a study we conducted in Malawi [12], we found that, despite being interviewed using computer-assisted interviewing techniques; sexual partners often disagreed about the extent of their sexual networking and the risk behaviors they displayed during their relationship.

More recently, several studies have suggested that estimates of the prevalence of sensitive behaviors in a population could be improved by asking questions about a third party, rather than by asking respondents questions about themselves. Such third parties have included best friends [13] and confidants [14-16]. The rationale for this strategy is three-fold. On the one hand, asking about best friends or confidants is likely to produce a sample whose characteristics are close to those of the underlying population. This is the case because "birds of a feather flock together" [17, 18] and so respondents and their best friends are likely to be similar along several important dimensions (e.g., age, education). On the other hand, respondents are also likely to be well aware of the behaviors of their best friends and confidants, including the most sensitive ones. Finally, social desirability biases are less likely to affect respondents when they are asked questions about their best friends and confidants, than when they are asked questions about themselves [13]. Several studies have thus found that such third-party reports produce higher estimates of under-reported behaviors such as sexual activity among youth [13], multiple sexual partnerships or abortions [15].

While promising, the hypotheses underlying the use of such methods have not been thoroughly tested. Even though homophily plays a crucial role in friendship choices, sociological research has also identified several "class size paradoxes" [19]. In particular, our friends often have more friends than we do and may not be a representative sample of the broader population. If having more friends is associated with

a higher likelihood of acquiring new sexual partners, for example, then best friend reports of the prevalence of multiple sex partners may be systematically biased upwards. Reports of friendship are also not necessarily reciprocated [20]: the person we consider as our best friend may believe that their best friend is someone else. As a result, sampling biases may affect the third-party method. Similarly, little empirical research exists on which sensitive behaviors best friends and confidants actually discuss. One may also confide to different persons about different behaviors. Ultimately, the third-party method should be validated by testing these various assumptions and comparing the resulting classifications to more objective measures of risk behaviors. Biomarkers of HIV infection constitute one such benchmark against which to validate third party reports of risk behaviors [21].

In this paper, we use unique data on social and sexual networks collected in Likoma Island (Malawi) to validate the use of third-party reports for the measurement of sensitive behaviors during surveys. In particular, we focus on the use of third-party reports to estimate the prevalence of multiple sexual partnerships in populations affected by generalized HIV epidemics.

1. Data

a. Study context

Our study takes place in Likoma, a small island located in the Northern part of Lake Malawi, deep in Mozambican waters. The island stretches over roughly 18 km² and comprises several ethnic groups including Nyanjas, Tongas and other groups traditionally residing on the mainland of Malawi (e.g., Tumbukas). Poverty is omnipresent with more than 90% of the local population living on less than a dollar a day in 2007. The local economy is driven by fishing-related activities, with a few islanders engaged in small-scale retail activities (buying goods in Malawi or Tanzania and selling them after mark-up on the island). Schooling is widespread, due to the early establishment of an Anglican mission on the island. Today, an increasing proportion of the island's population is joining new Christian churches.

b. Study design

The data in this study come from the second round of the Likoma Network Study, conducted in 2007/08. First, we conducted a census of every individual on Likoma Island to obtain a roster of potential friends and sexual partners. Household informants were asked to provide names, maiden names (for married women), nicknames, and sociodemographic characteristics of all household residents. More than 1300 households were listed in Likoma, and approximately 500 in Chizumulu. The enumeration also included: (i) temporary migrants (i.e. household residents who were temporarily absent); (ii) family members who had moved permanently during the past 5 years; and (iii) family members who had died during the past 5 years. Second, we conducted a survey of sexual and social networks with all inhabitants aged 18–49 years. The saturated sampling frame used in this study then allowed us to construct the population-level sexual network by matching the reported sexual partners with the census roster, and then linking the data of all young adults residing in the sample villages. The context and methodology of this survey are summarized in [22].

c. Collection of best friend reports

During the second round of the LNS, we also included a series of questions about a respondent's best friend. These questions proceeded as follows: first, respondents were asked to think about their best male/female friend; second, they were asked how often they saw that person and where s/he resided; finally, they were asked whether they believed that their best friend has engaged in multiple sexual partnerships in the last 12 months. Respondents could answer "yes", "I suspect" or "no" to that question. They could also refuse to answer or state that they didn't know, following the same ACASI procedures described above. After answering this initial set of questions about their best friend, respondents were asked to provide the full name of their best friend, so that we could trace them in the population rosters described above. Tracing of best friends was accomplished using the same method we used for tracing sexual partners [22, 23].

d. Covariates

We consider standard individual-level covariates in our analysis including age, marital status (currently married/never married/divorced or widowed), educational attainment (whether the respondent completed primary school) and enrollment (whether the respondent is enrolled at the time of the survey) and short and long-term migration history (how often the respondent travels to mainland Malawi and whether s/he has resided outside of Likoma in the past 3 years). These covariates are available for both the respondent and their best friend. We also consider dyadic characteristics of the relation between respondents and their best friend including distance between residences and frequency of interaction.

2. Methods

a. Selectivity of the study sample

We were not able to trace all the best friends nominated during the study. We thus start by describing the selectivity of our validation sample. To do so, we compare traced and non-traced best friends on the key individual and dyadic-level covariates described above. We do so using simple t-tests and χ^2 tests of association.

b. Are best friends representative of the larger population?

We then focus on testing the proposition that best friends are similar to the representative sample of respondents initially drawn. We do by comparing the socioeconomic characteristics and the self-reported behaviors of respondents and their best friend using statistical tests for paired samples. Second, we measure the indegree of best friends, i.e., the number of times they are mentioned as best friends by population members. We investigate the association between indegree and number of sex partners self-reported by the nominated best friend.

c. Analyses of non-response patterns

We report the extent of item-specific non-response in our best friend module. Specifically, we show how many respondents refused to answer questions about their best friends. We then test whether item-

specific non-response was associated with characteristics of the respondent and/or characteristics of the nominated best friend.

d. Comparison of self-reports and best-friend reports of multiple sexual partnerships

We systematically compare the reports of multiple sexual partnerships obtained from self-reports and best-friend reports. We classify respondents along the following dimensions:

		Multiple partners according to best-friend reports	
		No	Yes
Multiple partners according to self-reports	No	Consistent	Secretive respondent
	Yes	Uninformed best friend	Consistent

Table 1: Classification of respondents according to their own self-reports and their best friend reports.

We use multinomial logit models to test for differences between each cell of the classification in table 1.

e. Do best-friend reports strengthen the correlation between HIV/STI and risk behaviors?

Finally we use biomarker data on HIV status collected as part of the LNS [24], as well as self-reported data on STI symptoms, to test whether the use of best-friend reports may strengthen the observed correlation between reported behaviors and risk of infection. We thus compare the prevalence of HIV and reported STI across the four cells in table 1.

3. Preliminary results

In 2007/08, 1,964 (out of 2,014) respondents provided information about their best friend. Two thirds of nominated best friends were residing in the same village as the respondent and 93% of all best friends were residents of Likoma. In total, 1,652 best friends were traced in the population rosters and 1,312 were interviewed as part of the study. A large number of respondents reported seeing their best friend everyday or at least several times a week (75%). Despite these frequent interactions however, more than a third of the respondents reported not knowing whether their best friend had multiple sexual partnerships during the 12 months prior to the survey. Among those who provided an answer to this question however, the prevalence of multiple sex partnerships among best friend was very high: close to a third of all best friends were said to have had sex with more than one person in the past year. Interestingly, the prevalence of multiple sex partnerships during the past year was only slightly higher among best friend of male respondents than among best friends of female respondents (37 vs. 31%).

References

1. Cleland J, Boerma JT, Carael M, Weir SS. **Monitoring sexual behaviour in general populations: a synthesis of lessons of the past decade.** *Sex Transm Infect* 2004,80 Suppl 2:ii1-7.

2. Messeri PA, Allen JA, Mowery PD, Heaton CG, Haviland ML, Gable JM, Pedrazzani SD. **Do tobacco countermarketing campaigns increase adolescent under-reporting of smoking?** *Addict Behav* 2007,32:1532-1536.
3. Muir J, Lancaster T, Fowler G, Neil A. **Community based heart health promotion project in England. Self reporting overestimates smoking cessation rates.** *BMJ* 1998,316:704; author reply 705.
4. Stockwell T, Donath S, Cooper-Stanbury M, Chikritzhs T, Catalano P, Mateo C. **Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall.** *Addiction* 2004,99:1024-1033.
5. Hewett PC, Mensch BS, Erulkar AS. **Consistency in the reporting of sexual behaviour by adolescent girls in Kenya: a comparison of interviewing methods.** *Sex Transm Infect* 2004,80 Suppl 2:ii43-48.
6. Mensch BS, Hewett PC, Jones HE, Luppi CG, Lippman SA, Pinho AA, Diaz J. **Consistency in women's reports of sensitive behavior in an interview mode experiment, Sao Paulo, Brazil.** *Int Fam Plan Perspect* 2008,34:169-176.
7. Mensch BS, Hewett PC, Erulkar AS. **The reporting of sensitive behavior by adolescents: a methodological experiment in Kenya.** *Demography* 2003,40:247-268.
8. Mensch BS, Hewett PC, Gregory R, Helleringer S. **Sexual behavior and STI/HIV status among adolescents in rural Malawi: an evaluation of the effect of interview mode on reporting.** *Stud Fam Plann* 2008,39:321-334.
9. Gregson S, Mushati P, White PJ, Mlilo M, Mundandi C, Nyamukapa C. **Informal confidential voting interview methods and temporal changes in reported sexual risk behaviour for HIV transmission in sub-Saharan Africa.** *Sex Transm Infect* 2004,80 Suppl 2:ii36-42.
10. Luke N, Clark S, Zulu EM. **The relationship history calendar: improving the scope and quality of data on youth sexual behavior.** *Demography* 2011,48:1151-1176.
11. Phillips AE, Gomez GB, Boily MC, Garnett GP. **A systematic review and meta-analysis of quantitative interviewing tools to investigate self-reported HIV and STI associated behaviours in low- and middle-income countries.** *Int J Epidemiol* 2010,39:1541-1555.
12. Helleringer S, Kohler HP, Kalilani-Phiri L, Mkandawire J, Armbruster B. **The reliability of sexual partnership histories: implications for the measurement of partnership concurrency during surveys.** *AIDS* 2011,25:503-511.
13. Yeatman S, Trinitapoli J. **Best-friend reports: a tool for measuring the prevalence of sensitive behaviors.** *Am J Public Health* 2011,101:1666-1667.
14. Rossier C. **Abortion: an open secret? Abortion and social network involvement in Burkina Faso.** *Reprod Health Matters* 2007,15:230-238.
15. Rossier C, Guiella G, Ouedraogo A, Thieba B. **Estimating clandestine abortion with the confidants method--results from Ouagadougou, Burkina Faso.** *Soc Sci Med* 2006,62:254-266.
16. Rossier C. **Estimating induced abortion rates: a review.** *Stud Fam Plann* 2003,34:87-102.
17. McPherson M, Smith-Lovin L, Cook JM. **Birds of a feather: Homophily in social networks.** *Annual Review of Sociology* 2001,27:415-444.
18. McPherson JM, Smithlovin L. **Homophily in Voluntary Organizations - Status Distance and the Composition of Face-to-Face Groups.** *American Sociological Review* 1987,52:370-379.
19. Feld SL. **Why Your Friends Have More Friends Than You Do.** *American Journal of Sociology* 1991,96:1464-1477.
20. Carley KM, Krackhardt D. **Cognitive inconsistencies and non-symmetric friendship.** *Social Networks* 1996,18:1-27.
21. Hewett PC, Mensch BS, Ribeiro MC, Jones HE, Lippman SA, Montgomery MR, van de Wijgert JH. **Using sexually transmitted infection biomarkers to validate reporting of sexual behavior**

- within a randomized, experimental evaluation of interviewing methods.** *Am J Epidemiol* 2008,168:202-211.
22. Helleringer S, Kohler HP, Chimbiri A, Chatonda P, Mkandawire J. **The Likoma Network Study: Context, data collection, and initial results.** *Demogr Res* 2009,21:427-468.
 23. Helleringer S, Kohler HP. **Sexual network structure and the spread of HIV in Africa: evidence from Likoma Island, Malawi.** *AIDS* 2007,21:2323-2332.
 24. Helleringer S, Kohler HP, Frimpong JA, Mkandawire J. **Increasing uptake of HIV testing and counseling among the poorest in sub-Saharan countries through home-based service provision.** *J Acquir Immune Defic Syndr* 2009,51:185-193.