

## **Data Problems in Explaining Condom Use in East Africa**

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## **Abstract**

A systematic review assessed the existing research on reasons why people did or did not use condoms to prevent HIV infection in the PEPFAR countries of Kenya, Rwanda, Tanzania, Uganda, and Zambia for the years 1998-2013. The review of 48 quantitative analyses revealed myriad weaknesses in this body of research, which failed to explain people's use or non-use of condoms. This article focuses on one set of fatal problems: the use of unreliable and unproductive data. Overcoming these data problems might be overly difficult or impossible, unless perhaps quantitative research is preceded and followed by locally appropriate qualitative work.

## **Introduction**

For many years it has been widely known that the proper use of male and female condoms constitutes an inexpensive and effective way to avoid new HIV infections. This knowledge has led to myriad interventions worldwide to increase the availability and use of condoms – some focusing on supply, others on demand – which plausibly account for at least part of the drop in new infections in various populations. But it is also well known that resistance to using condoms is an important reason that HIV continues to be transmitted sexually.

One difficulty in changing this pattern is that condom use takes place in private settings and involves issues that many people feel uncomfortable discussing openly and honestly with anyone. Thus it is difficult for public-health agencies to know why sexual partners use or do not use condoms in a given situation, yet such knowledge might significantly improve interventions to reduce HIV incidence. Sadly, after more than two decades of research, patterns of condom use in East Africa remain unexplained.

To address the reasons for condom (non)use in Kenya, Rwanda, Tanzania, Uganda, and Zambia, a systematic review was undertaken, covering the years 1998-2013. This review comprised both qualitative studies and quantitative studies, the latter being the subject of the present article. The major questions included: What influenced people to (not) use condoms? What aspects of this question remain unanswered and how can they best be addressed? To provide a different perspective on this topic, the principal author is an anthropologist with quantitative skills and a focus on behavioural change, no prior background in public health, and a 'post-structuralist' theoretical approach, which is seen rarely among public-health practitioners.

The ultimate goal of this systematic review – and thus this article – is to improve HIV-prevention interventions. Unfortunately, the quantitative studies that addressed this issue are almost useless for this purpose. This summary explains one fundamental aspect of their failure – problems with data – and contains suggestions for improvement.

## **Methodology**

The systematic review focused on explanations of the (non)use of condoms leading to HIV prevention among the potentially sexually active populations of Kenya, Rwanda, Tanzania, Uganda, and Zambia. Articles published during the period 1998–2013 were eligible for selection.

The search strategy aimed to find both published and unpublished studies. It included several databases:

- The Cochrane Library and DARE were searched for systematic reviews using the term *condom\**. These reviews were then searched for references to germane works.
- The search for research articles on condom use and promotion specifically in the five countries under consideration was conducted through two portals: 1) AnthroSource, which makes available the 32 journals of the American Anthropological Association, and 2) Galileo Scholar, the University System of Georgia’s portal, which makes available more than 100 databases and 10,000 full-text journals and other periodicals. The searches combined the relevant placenames with the topical term: (*Keny\* OR Rwand\* OR Tanzani\* OR Ugand\* OR Zamb\* OR East Afric\**) AND (*condom\**)
- In addition, the Measure DHS website was searched for analyses based on quantitative surveys from each country.
- Further sources were identified through the reference lists of identified reports and articles; a Google Alert: *condom\* AND (Uganda\* OR Rwanda\* OR Kenya\* OR Tanzania\* OR Zambia\* OR “East Africa” OR “East African”)*; recommendations from researchers and other professionals in the field; and mentions in news articles. Reports published outside of journals were located through recommendations from experts and by browsing the websites of organizations active on this issue.

The title and abstract of the 597 works identified by this strategy were screened for inclusion, and eventually 48 reports with quantitative results were reviewed. Each article was

read closely in its entirety, as serious problems usually were not evident after skimming the text for results, much less after reading the abstract.

## **Results**

### ***Unreliable Data***

Unfortunately, none of the research reviewed can be assumed to have statistical validity because, when checked, the data were highly unreliable. Thus, it is not possible to evaluate any resulting explanation for condom (non)use. A statement from Kamali et al. exemplifies the problem: “30% of respondents who reported having used a condom at baseline said that they had never used a condom at round 2.”

Survey results regarding sexual practices were discredited when they were verified through other means. For example, comparing claims from interviews to the results for biological markers of sexual activity – pregnancy, new STIs, and semen in vaginal swabs – revealed startling inconsistencies. Plummer et al. (2004) found that, depending on the type of interview, 25-42 percent of males and 55-69 percent of females with biological markers of sexual activity denied *ever* having sex. Allen et al. (2003) found that 17 percent of regular participants who claimed to always use condoms actually had positive biomarkers – which is almost certainly a low figure, as explained below. Furthermore, the authors noted that “sperm and other biological markers also indicated ... that at least half of unprotected contacts in discordant couples were not reported.” Similarly, Feldblum et al. (2001) found that differences in reported rates of condom-use did not result in different rates of STIs.

It bears emphasizing that these biological markers will miss some unprotected intercourse, whether by females and males, and that they detect females’ sexual activity much more readily than males’. Indeed, Allen et al. (2003) found that biomarkers were *negative* 75 percent of the times when people reported having had sex without condoms. So, assuming that respondents were more likely to give the answers promoted by interventions, the reported discrepancies were almost certainly more massive than the measurements reveal.

Acknowledging the problem, Allen et al. stated, “Strategies that encourage truthful reporting of sexual behavior and sensitive biological markers of exposure are urgently needed.”

Given such discrepancies, researchers have attempted to compare methods of interview to determine which will produce more-reliable information about sexual practices. Regardless of

the method, they found great unreliability. For example, Plummer et al. (2004) compared a “face to face questionnaire survey,” “an assisted self-completion questionnaire survey,” and “in-depth interviews.” This last, qualitative method was considerably more reliable, yet, based on participant-observation and biological markers, the authors stated that “there is good reason to believe that sensitive behaviours were also underreported” in the in-depth interviews. They found participant-observation to be the most productive method for understanding sexual behaviour.

Hewett et al. (2004) tested whether using a computer to conduct standardized interviews would improve this situation. They compared a seemingly impersonal, machine-based process to face-to-face interviews, and then they conducted face-to-face exit interviews with all participants. As expected, in the first round more respondents revealed sensitive information to the computer than to the human interviewer. But respondents from both streams answered inconsistently in the exit interview: some newly revealed sexual activity and some newly denied it. Thus, the authors concluded that “computerized administration is not a panacea to underreporting of sexual behaviour.”

To summarize: different survey techniques produce different answers for this topic in this region, and none is sufficiently reliable.

Mattson et al. (2008) produced the only article that both verified interview responses using biological markers and found them reliable, but they tested for STIs only in males. The infrequency of new infections makes this a much less sensitive test compared to the range of biological markers for women – which nonetheless have significant gaps. In support of their contention that the data were reliable regarding sexual activity and infections, the authors briefly reported group trends rather than reporting whether STIs occurred among the specific individuals who claimed to have used condoms consistently, as in the studies above. Further, the loss of 24 percent of participants to follow-up might have affected the results. Thus, this study does not provide convincing evidence of reliable data, especially given the counterexamples above.

Finally, it is entirely possible that respondents misreported answers at a debilitating rate regarding other variables – such as marital status or level of education. Apparently these responses were not verified at all.

### *Other problems with reliability*

The research comparing different data-producing techniques, cited above, seems to have been performed relatively carefully. However, some other studies depended on unsound methods that would only decrease reliability. Such methods included using the personnel who carried out the intervention to conduct the survey; this apparently was the case with the intervention that reported, by far, the most successful results (Lightfoot et al. 2007).

Another problem involved the wording of questions. Interviewers sometimes changed the standardized questions on an ad hoc basis to make them less explicit, and problems inherent in translation also changed the meaning of questions. For example, relevant disease terms in some languages encompassed more conditions than simply HIV/AIDS (McCombie 2003; Coast 2007).

This is not a complete list of discernible problems, even though much of importance remained unreported regarding the extent to which interviews and their contexts varied within a single survey.

### *Incomplete interviews*

The issues discussed above might be labelled ‘procedural.’ By themselves they are more than enough to question any quantitative result in the systematic review. But, even if the issue of reliability is ignored, lacunae in the interview schedules severely weakened these studies and limit their utility.

### *Misplaced focus*

For example: amazingly, subjects in this corpus of research were not asked why they did or did not use condoms. People are experts in their own lives and are more likely to portray their motivations coherently than is a statistical analysis of predefined answers to a universal questionnaire – especially one that does not ask in any form about these motivations. Indeed, the qualitative research in this systematic review, in which people were asked directly to explain their behaviour, gave a much better – if still incomplete – explanation for condom (non)use (e.g. Thomsen et al. 2004). For instance, it is common in conversations about condoms to hear that they make sex feel less pleasurable physically, but this obvious consideration is absent from the quantitative literature. Future research could ask whether an individual’s frequency of condom-use is predicted by his or her aversion to condoms because of numbness or chafing.

Asking directly in any form would represent an improvement. But to produce an interpretation useful to public-health interventions would require attention to several aspects of ‘why.’ For example, it is important to obtain data in a way that can explain:

- why people who seem identical according to the usual survey categories (age, education, intervention, and so on) differ in their condom use, including in their responses to an intervention
- why individuals have changed their patterns of condom use
- why an individual uses a condom in one situation but not another, including when those situations appear similar to researchers

In each of these cases, an elusive logic needs to be captured. For example, if level of education is correlated with greater condom use (Adair 2008) – although not monotonically – why don’t all people with the same type of education behave the same way? What is it about schooling that has this effect – knowledge of disease transmission, self-concept, psychological affiliation with official discourse, different sorts of sexual partners, different types of discussion with them? It might be possible to incorporate the answer into public-health interventions, in a way that the weak correlation between condom-use and education is not. Likewise, a similar approach might convert the (sometimes non-monotonic) correlation found between wealth and condom use (Vinod et al. 2007; Silas 2013) into actionable knowledge.

Instead, some analyses appear to be statistical exercises rather than attempts at explanation. Silas (2013), for example, tested variables and created a model relating “predictors” to condom use. Then he conducted a “multivariate logistic analysis” showing, for example, that “non-use of condoms at last higher-risk sex is higher among employed women than among unemployed women.” No attempt was made to ascertain how these characteristics related to sexual practices in everyday interactions, nor was it shown how some people with those characteristics did and others did not use condoms. Explanation, in short, was lacking, as was a path to implementing this knowledge in public-health campaigns.

As noted, research needs to explain why an intervention worked only among the specific participants who increased their condom use. What aspects matched between these participants and the intervention? For example, what about entertainment-education made some soap-opera listeners, but not others, more likely to use condoms (Vaughan et al. 2000; Van Rossem and Meekers 2007)? Did the former tune in on a day when a particularly powerful message was

imparted? Did they identify more strongly with a specific character's situation? Did they simultaneously have other experiences that increased their affiliation generally with public-health programs? Such knowledge would be helpful in targeting further interventions and in designing new research to identify successful strategies for the participants unmoved by the first one.

Some people change their sexual practices without participating directly in an intervention. Knowing what combination of factors has led people to change of their own accord, relatively speaking, would provide clues for the design of interventions that would replicate this process of behavioural change.

Finally, since many respondents reported using condoms inconsistently, it would be useful to know why. For example, why use a condom with a spouse but not a casual partner? Or why use one inconsistently with the same category of partner, or even the same individual partner? Knowing these key differences between situations would help to pinpoint the issues that programs should address.

Unfortunately, the pursuit of such knowledge is lacking from the quantitative research reviewed. Instead, the studies reviewed looked for crude 'determinants' of condom use or for the effect of whole interventions, without generating data that allowed the identification of the specific processes that led to changes in people's claimed behaviours. Furthermore, the qualitative literature does not substantially elucidate most of the quantitative results because so many of the variables in the quantitative studies are either too abstract or askew from the observable processes affecting condom use. If researchers find that standardized questionnaires cannot practically address such questions, they should reconsider their reliance on them.

### ***Assumed universalism***

This body of research failed to explore cultural differences that likely would – and in some cases obviously did – affect answers to survey questions. This is part of a larger, lamentable tendency to accept researchers' "common-sense" categories of analysis as universal. These include, but are not limited to, survey items such as marital status, disease terms (as mentioned above), and country.

Country-level analysis deserves special mention. Because it depends on a weighted average of diverse peoples, an explanation based on composite, country-level data is suspect in

documenting or explaining any specific subgroup's pattern of condom use. The qualitative literature is full of local specifics, but even national surveys report internal differences that should provoke analyses tailored to local patterns. For example, in the *Uganda AIDS Indicator Survey 2011*, Karimojong respondents had much higher rates of syphilis and lower rates of HIV than did members of other ethnic groups, and a much higher percentage refused HIV testing (although the majority did cooperate). No quantitative study in the systematic review investigated differences of this sort.

The qualitative research from these countries revealed greater variety than a universal survey such as the AIS could capture – differences that would affect responses to questionnaires, and, more importantly, to public-health interventions. A far-from-exhaustive list includes “temporary marriage” (Merten and Haller 2007), polygyny (ibid.), and matrilineality (Apter 2012); preference for metaphorically “wet” or “dry” sex (Tamale 2005; Montgomery et al. 2010; Norris and Worby 2012); institutionalization of premarital sex (Lesorogol 2008); belief in unique physiology rendering condoms ineffective (Coast 2007); and models of health and disease based on worms that inhabit each person's body (Geissler 1998). Country-level analysis, leading to country-level strategies, would either miss these important local differences or overgeneralize from them.

As the saying goes, “the past is a foreign country,” but the quantitative research reviewed paid no attention to historical and other temporal changes, either. These include historical changes on the national and local level, such as wars (Finnström 2009), other anti-HIV programs, demographic changes, and new trends in popular entertainment; changes in tribal practices; seasonal differences in attitudes and practices; and developmental changes in individuals.

The upshot of this discussion is that the more “universal” the questionnaire and analysis, the less it will fit the specific conditions in any particular place and time. And these incongruities are demonstrably large. Put differently, explaining condom use requires research that incorporates knowledge of local conditions in the flow of time – not one-size-fits-all censuses. Local specificity might appear inconvenient to analysis, but it exists and must form part of any effective research plan.

### ***Suggestive results***

To reiterate: no finding from this literature should be trusted, even negative ones. Nonetheless, some investigators raised more promising questions than others. For example, Benefo (2010) asked about the effects of different characteristics of settlements, such as population density, on condom use.

Also, a few researchers raised the issue of how psychological orientations affected condom use. Those mentioned in the combined qualitative and quantitative literature included being fatalistic, future-oriented, self-efficacious (Vaughan et al. 2000), bold, or sexually cautious. No researcher delved into these issues with sufficient rigor or depth; for example, Hattori et al. (2010) found sexual caution to be positively correlated with condom use in three countries but to be negatively correlated in a fourth country (despite claiming a positive correlation for all four in the abstract), yet the authors did not explain why this difference existed. Nonetheless, psychological orientations – whether enduring or context-dependent – might help to explain why a person changes his or her practices and why otherwise similar people act differently. Indeed, one of the most productive studies (qualitative) found that streetwalking sex workers were more likely than bar-based ones to demand condom use, and the authors linked this to the streetwalkers' greater extroversion – along with their different aims and their clients' stereotypes of risky sexual partners (Agha 2004).

Depending on one's model of psychology, similar questions might be addressed quantitatively. However, the inconsistent findings for sexual caution suggest that sexual histories might result *in* these psychological orientations as much as they result from them.

### **Discussion**

Two major, lingering questions are: 1) To what extent can quantitative methods, employed optimally, explain why people in these five countries use or do not use condoms? 2) Would the results justify an attempt at such rigor?

The first question remains open. Obtaining biomarkers from large numbers of people, interviewing them effectively about every possible influence on condom use, paying attention to changing local conditions, creating an index of perceived risk and possibly other influences: this is a massive endeavour. And the usefulness of the results for reducing future infections remains unknown.

To answer the second question requires knowing what alternatives exist. The systematic review (see the full report at <http://condomsineastafrica.wordpress.com>) suggests that – while still incomplete – the qualitative literature does a much better job of explaining condom use.

Some of this qualitative research was preliminary to producing surveys that had more local salience. This two-step approach can partially remedy the data problems discussed in this article. An even better methodology would consist of three steps: an individual or team would conduct qualitative research initially, use the knowledge produced to undertake a survey, and use those results as a springboard for further qualitative research to understand people's condom use. Indeed, the quantitative results could provide a productive topic for discussion between researchers and subjects.

Whatever their approach, investigators should examine more than basic sociological categories as potential correlates of condom use. Psychological orientations provide a promising additional type of variable.

### **Limitations**

This review has several inherent limitations, two of which deserve mention here. First, the review cleaved strictly to the question of why people did or did not use condoms. Quantitative studies that did not address this issue might have employed better methods. Indeed, the studies reviewed might have addressed other questions more successfully, or, more likely, might have reported on a successful intervention. It is potentially tragic that unreliable data, along with other research problems, prevent us from knowing which interventions worked best in a given context and why. Conversely, the review's focus on explanations – and this article's restriction to problems with data – means that other problems in the literature were not exposed.

Another limitation is that the systematic review covered reports regarding these five countries only. Perhaps researchers in other regions have surmounted – or not even encountered – these problems with data.

### **Conclusions**

After decades of campaigns against HIV in these five countries, public-health practitioners still readily admit that they do not understand sufficiently why people do or do not use condoms. One suspects that this disappointing state of knowledge results from professional exigencies and

rewards rather than from a sincere belief that the types of study reviewed here optimally explain condom use. In any case, they do not. Unless the problem of unreliable data is resolved, even quantitative studies that ask salient questions and analyse them appropriately should not inform programs to increase condom use.

Indeed, more-productive questions would in many ways lead to a statistical approximation of qualitative research. After so many years of privileging quantitative studies, perhaps it would be more effective and efficient to make qualitative research the standard for explaining condom use and see whether the results improve.

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