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Improving the Validity of Self-reported Sexual Behavior: No Easy Answers

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Accurate measurement of sexual risk behavior is essential to understanding sexually transmitted infection (STI) transmission dynamics and measuring the effects of sexual risk-reduction interventions. Historically, sexual behavior research has been typically limited to an examination of *self-report* of past behavior. However, challenges in obtaining accurate measurements of self-reported sexual behavior are well-documented. Indeed, adolescents' self-reported sex behavior is sometimes confusing, inconsistent and, at times, contradictory.

In this issue, Anderson and colleagues report on the effectiveness of two types of counseling messages to avoid unprotected vaginal sex during a brief treatment period for curable STIs. Specifically, the authors report on the effectiveness of either abstinence only or abstinence combined with condom use promotion counseling messages. While there are many aspects of the well-designed and implemented study worthy of additional comment, we focus on one, validity of self-reported sex. This study highlights strategies to reduce potential sources of bias in the measurement of sexual risk behaviors, and it also highlights the need for additional research to improve the validity of self-reported behavior.

Anderson and colleagues used several procedures to minimize potential sources of bias in the measurement of unprotected sex during the treatment period. Threats to the validity of self-reported measures of unprotected sex include social desirability bias, recall bias, cognitive demands associated with recalling past behaviors, lack of awareness of condom errors and poor comprehension of survey questions. Motivational biases may be particularly pertinent to reporting of sensitive health behaviors, where it is commonly assumed that individuals underreport risk behaviors because of the sensitive, personal, and sometimes stigmatizing nature of such behaviors.[1–3] In turn, motivational biases may lead individuals to distort their self-reported behavior to avoid shame or embarrassment or to appear in a more favorable light. [1,2]

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In the study conducted by Anderson and colleagues, the authors assessed participants' self-reported sexual behaviors via a face-to-face interview, an assessment approach typically used in clinical venues. In addition to self-reported behavior, the authors collected vaginal swabs tested for prostate-specific antigen (PSA). The authors observed that approximately 10% of participants, overall, had biologic evidence of recent unprotected intercourse detected at the 6-day follow-up visit. The proportion of women with PSA detected was slightly higher in the abstinence-plus-condom group (11.9%) compared to the abstinence-only group (8.4%) although the difference was not statistically significant (RD = 3.5; 95% CI −3.5 to10.5).

While concerning, particularly given that women are being treated for an STI and the period of assessment is brief (6 days), this may be an underestimate of sexual intercourse. The PSA detection window is only 48 hours, thus, women may have had unprotected vaginal sex beyond this detection window would not be identified as PSA-positive. Moreover, an estimated 71% of women exposed to semen will test negative for PSA by 24 hours. Furthermore, use of PSA does account for the proportion of women who may have only engaged in anal intercourse or may have substituted anal intercourse for vaginal intercourse during the treatment period. Thus, the observed PSA rate of 10% should be interpreted as the lower bound of the frequency of sexual intercourse during the treatment period. While the "true" proportion of women engaging in sexual intercourse is undetermined, it is safe to say that it may be substantially higher than observed. This finding is cause for concern and suggests that more intensive interventions are needed to modify women's sexual behavior.[4]

While PSA testing provided a useful complement to self-reported behavior in this study it could not substitute for the collection of self-reported data given PSA's narrow detection window. The investigators, well aware of this limitation, discussed other potential biomarkers, such as Y-chromosome detection using a PCR assay; however, this test also had limitations in the context of this study as the detection window is too broad, detecting exposure to Y-chromosome that occurred beyond the 6-day treatment period, overestimating the proportion of women having unprotected vaginal intercourse. Furthermore, biomarkers such as PSA, Y-chromosome or spermatozoa detection also have other potential limitations, including cost, equipment needed to conduct assays, and applicability only among females. Other potential biomarkers, including incident STIs or pregnancy, also have inherent limitations given that these events do not occur after every unprotected sex act.

Despite potential limitations, biomarkers of sexual behavior are useful and are recommended, when feasible, rather than relying solely on self-reported sexual behavior, given documented discrepancies between biologic data and self-reported sexual behavior.[5–8] For example, >10% of adolescents who tested positive for an STI in a nationally-representative survey self-reported abstinence in the prior 12 months.[6] Similarly, approximately 17% of adolescents from four U.S. cities with a laboratory-confirmed STI endorsed lifetime or recent abstinence from vaginal sex.[5]

Anderson and colleagues also attempted to reduce bias by obtaining consent to conduct PSA testing following collection of biologic specimens. The aim was to reduce the likelihood that participants would modify reporting of their behavior as a result of prior knowledge of PSA testing. Although the investigators did not present whether the differences were statistically significant, the proportion of women testing PSA-positive was greater than the proportion who endorsed recent unprotected sex, suggesting room to improve self-report of even very recent (i.e., within 2 days) sexual behavior.

Discrepancies between self-reported behavior and biomarkers of sexual behavior are not randomly distributed. Several studies have identified factors associated with discrepancies

between self-report and biologic data.[5,9] Factors have included perceptions of peer norms, STI knowledge, HIV status, age, and race/ethnicity, among other factors.[5,9]

Recommendations to improve the validity of self-reported sexual behavior have been suggested and include techniques to improve recall (providing anchor dates, use of timeline-followback calendars and recall of memorable events during the reporting period, etc.), self-completed assessments, such as audio computer-assisted self-interviews (ACASI) to reduce socially desirable responding, use of language that is easily understood, placing the burden of denial on the participant (e.g., asking “how many times” rather than “if” a behavior occurred), providing confidentiality assurances, stressing the importance of accurate reporting for the development of programs that may benefit others, and including validity checks within assessments.[3,5] While ACASI is widely thought to reduce socially desirable responding, we are aware of only study which compared the validity of ACASI and face-to-face interview data in relation to semen exposure, and that study observed no difference by interview modality.[7]

There is a clear, cogent and compelling need to improve the validity of self-reported sexual behavior. Additional observational research to identify reasons and motivations for less than accurate self-reported behavior would be useful. Intervention research to test strategies designed to improve the validity of self-reported sexual behavior are also needed. For example, self-report assessments could be designed to address misconceptions about sexual content and reduce potential discomfort or difficulty responding to sexual behavior questions. Additional strategies could address respondents’ knowledge gaps regarding sexual health and reduce their tendency to respond in a socially desirable fashion to avoid embarrassment or discomfort. The use of validity checks of self-reported sexual behaviors both within and across multiple assessments may also improve data quality. Strategies should also be employed to stress the importance of accurate reporting throughout the survey (e.g., in questionnaire instructions) and provide repeated information regarding how data will be utilized (e.g., analyzing data across participants rather than examining individual responses). Ultimately, use of sexual activity biological markers combined with strategies to improve the validity of self-reported of sexual behavior data will improve researchers’ abilities to accurately measure sexual behavior, STI transmission dynamics and the efficacy of STI prevention interventions.

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