

Accuracy of Self-Report of Sexual Activity among Adolescent Girls: Implications for Interpretation of Vaginal Flora Patterns

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We read with interest the article by Hickey et al. (1), which enrolled 31 healthy, asymptomatic premenarcheal girls (primarily Tanner stages 2 or 3) aged 10 to 12 years (of whom 67% were African American) with no history of sexual contact whose vulvar and vaginal microbiota were monitored quarterly for up to 3 years. *Lactobacillus* species were dominant in the vaginal microbiota of most girls before the onset of menarche in the early-middle stages of puberty (as the production of estrogen during puberty causes a change in the vaginal flora to lactobacillus predominance) (2). However, *Gardnerella vaginalis* was detected in appreciable levels in approximately 1/3 of women. This is of significant interest given that *G. vaginalis* has been the bacterium most extensively studied in relationship to the pathogenesis of bacterial vaginosis (3–5). Several limitations of this study may have confounded the *G. vaginalis* results.

This study, like others (6–9), has the limitation of self-reporting of sexual history by vulnerable adolescents who may be reluctant to fully disclose their sexual behavior, particularly when their parents are aware of their participation in a study. Notably, in the Hickey study, participants' mothers were present during the enrollment visit and invited to participate in annual sample collection if they met certain inclusion criteria. The mother's presence in (or close proximity to) the room where the adolescent was being evaluated could have influenced her sexual history report, including a history of sexual assault. In the National Violence against Women Survey, nearly 1 in 6 women reported a history of sexual assault (10); a significant racial disparity exists (11). Other factors known to influence reliable sexual histories include poor understanding of the questions, reporting behavior according to perceived expectations, inability to recall prior sexual experiences, and miscommunication between the interviewer and interviewee (12).

It is also unclear how a "history of sexual contact" was defined in the Hickey study. Did this include other types of sexual activity (i.e., receptive oral sex, digital penetration, genital-genital contact, etc.) besides penile-vaginal sex? Did this include a history of female sexual partners in addition to males? A study of women who have sex with women found that digital-vaginal sex and sharing of sex toys was associated with a higher risk of colonization with *G. vaginalis* (13). Additionally, a study of "virginal" women (no history of penetrative vaginal sex) found that 45% had *G. vaginalis* detected from tampon specimens; *G. vaginalis* was significantly more likely in women participating in receptive oral sex and digital-genital contact (without penetration) than in women with genital-genital contact (14). In the absence of a clear definition of sexual contact and gender of sexual partners in the Hickey study, it is possible that women with *G. vaginalis* had a history of sexual activities other than penile-vaginal sex and sexual partners other than men. Interestingly, in a study of prepubertal girls (3 months

to 5.7 years; Tanner Stage 1), *G. vaginalis*, though specifically sought, was not found (15).

Despite these limitations, the Hickey study is still the first prospective longitudinal study to use modern sequencing techniques to characterize changes in the vaginal microbiota of adolescent women as they progress through puberty to menarche. While unique in this aspect, it has methodological limitations present in other studies of "virginal" adolescent women found to have *G. vaginalis* in their vaginal flora (6, 8, 9). Although the Hickey study undoubtedly strived to obtain the most accurate representation of young adolescent women who truly had no history of partnered sexual activity, this may not be possible. The use of Y chromosomal DNA (Yc DNA) (as a biomarker for heterosexual sex) (16) in future vaginal microbiome studies of adolescent women could potentially alleviate some of the self-reporting limitations. However, Yc DNA is detectable only up to 15 days post-coitus (17) (which would necessitate more frequent sampling), it is not detected reliably in women using condoms correctly (18), and testing would not provide data with regard to recent sexual activity with women.

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