Sexually Transmitted Infection – Editorial

**Title**: Adolescent sexual health: time to invest in a healthy future generation

**Authors:** Vicky Jespers, Christiana Noestlinger, Janneke van de Wijgert

Good adolescent sexual health is the cornerstone of future healthy families and is essential for the development of optimal intimate and social relations including gender equality.[1] Investing in adolescents’ sexual health may consolidate early gains, or offer a second chance to those who missed out during childhood.[2] The right to access age-appropriate sexuality education at home and in school, and to tailored services for sexual and reproductive health, should be granted to all adolescents.[3] Such services should be confidential, i.e. without the obligation to inform parents or partners, should be delivered in a non-judgemental manner, and should include actual access to contraceptives and treatment of sexually transmitted infections (STIs). Comprehensive sexuality education, i.e. the provision of information and guidance tailored to different cultural and socioeconomic backgrounds on physical and emotional aspects of growing up and starting relationships[4], has shown to effectively delay onset of sexual activity, reduce the frequency of sexual activity and number of sexual partners, increase condom and contraceptive use, and reduce the experience of negative sexual health outcomes such as teenage pregnancies and infections with HIV or STIs.[5,6] Several frameworks using evidence-based standards and criteria offer guidance on how to set up comprehensive or holistic sexuality education.[2,7] Implementation requirements are known to be complex and need sufficient attention to avoid repetition of previous failures.[8] Thus, the issue rather lies in the implementation and scaling-up of evidence-based strategies known to effectively improve adolescent sexual health. Implementation has lagged behind globally, as sexual health is typical a field driven by normative rather than evidence-based policies.

The highest burden of poor adolescent sexual health is found in low income countries.[9] Especially vulnerable are adolescents who lack the basic school or home support (for example, out of school adolescents with no access to school-based health programmes), orphans and vulnerable adolescents lacking the financial and emotional support to access education or health services, and adolescents in rural communities who are faced by time and financial constraints to access distant services. Moreover, the highest burden of HIV and STIs is in low income countries and adolescents in those countries therefore have an increased risk of acquiring these infections.[10] The drivers of adolescents’ vulnerability to HIV/STIs are compounded by structural, social, and biological factors.[1,11] However, poor adolescent sexual health is not limited to low income countries: unplanned pregnancies and chlamydial and human papillomavirus (HPV) infections are also common in the majority of middle and high income countries. Adolescents suffering from poor sexual health are often out of school, vulnerable to risky behaviours such as alcohol and drug use, or are part of migrant populations with poor access to services due to insecure housing, lack of social security and high mobility.

The article of Kerubo et al. serves as a commendable description of this high burden of reproductive tract infections (RTIs) in 515 rural schoolgirls aged 14-17 years from a Luo population in Kenya and shows that reproductive tract symptoms were reported in 32% of the laboratory confirmed infections (restricted to *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhea,* bacterial vaginosis and *Candida albicans*). The prevalence of RTIs, excluding *C. albicans*, was around 24% with nearly a quarter of the infections being identified as an STI. Accepting that this is a representative sample of the rural schoolgirl population in Kenya, we learn that one in twenty girls are possibly suffering from an STI at this early age and a further one in fifteen has vaginal microbiota dysbiosis. As the authors rightly point out this number may even be higher in out-of-school girls.

Twenty four percent of girls, regardless of infection status, reported at least one genital symptom in response to structured questioning by a trained nurse. Vaginal discharge was reported by 10.5% and abdominal or vaginal pain by 8.8% of girls. When assessed against the actual presence of infections using diagnostic testing, symptoms were found to be poorly correlated with any of the RTIs. On the one hand the proportion of young girls reporting symptoms was very low considering the number of infections detected (57% for STI and 28% for vaginal dysbiosis). But on the other hand, the fact that one out of four young girls is suffering with genital pain and discomfort is alarmingly high; possibly leading to anxiety. Furthermore, less than 1% of the girls declared having had sexual intercourse in the last month. This is unlikely to reflect the truth. But if this was indeed the case then many of the STIs would have been acquired more than a month ago, putting the girls at risk for serious STI sequelae (such as infertility) and allowing for spread of the infection in broader sexual networks.

Symptom-based management of RTIs by definition misses all asymptomatic infections, but was always thought to be important in settings were no diagnostic laboratory testing is available and clinicians have to rely on syndromic management of RTIs.[12] We agree with the authors that a syndromic approach in this adolescent population is not effective due to the poor correlation between symptoms and presence of infections, but would like to argue further that even if adolescents had infection-related symptoms this approach would fail. First, because symptoms such as presented in the article have been defined by adults mainly from a medical background and are far removed from any age-specific or cultural meaning. This implies that real complaints are easily (dis)missed or that adolescents may be misinterpreted when questioned. More generally speaking, the exclusion of adolescents in biomedical research has been one of the barriers to effectively promoting their sexual health.[11] Second, adolescents are not likely to confide intimate details with adults if the benefits are not directly clear to them. Third, adolescents with symptoms may not have access to, or may not attend, services due to multiple reasons: interpretation of their symptoms as not relevant or important for their health; limited basic knowledge about their bodies and normal functioning; wrongly been reassured by their peers in absence of a confiding adult figure; anxiety leading to ignorance; worried about confidential aspects; and/or not have the finances to attend or reach services.

Two striking examples of adolescents not confiding intimate information of their reproductive health and sexual behaviour are shown in the study by Kerubo: five girls preferred not to answer and stated ‘don’t know’ for all symptoms; and only three of the 28 girls (11%) with a confirmed STI admitted to or recognised to have passed sexual debut. Challenges in accurately measuring of self-reported sexual behavior are well-documented among adolescents (as well as among adults). As with adults, adolescents’ self-accounts of their sexual behavior have been described as confusing, inconsistent and contradictory.[13] Underreporting due to social desirability may also apply to this study. In summary, symptom-based management of STI will let a large group of adolescents with STI, ‘asymptomatic or symptomatic’, go unnoticed.

To reduce STI prevalence among adolescents, the STI prevention-diagnosis-treatment-cure cascade in adolescents would need a stronger focus on prevention, timely diagnosis, and immediate linkage to care once diagnosed. These efforts should start at an early age and opportunities such as vaccination need to be considered (for example, HPV vaccination for 10-14 year old girls and boys currently instigated including in low income countries). While hopefully laboratory provisions for testing are up-scaled and innovative strategies e.g. point-of-care tests are being developed in the coming years, preventive screening for adolescents in high STI prevalence settings may be indicated sooner rather than later. It is a fact that STI screening and control is a cost-effective intervention among social networks of adults with high rates of partner change and in countries with high HIV and STI prevalence.[14] Further, confidential adolescent services offering the aforementioned combination prevention could be set up at schools to improve accessibility during day time. Another approach that needs exploration for STI prevention and sexual health and may become much embraced by adolescents is communication via internet.[15] E-health and m-health interventions maybe appealing to adolescents; as this is a generation who grew up with mobile phones and the internet, and with increasing access in low and middle income countries. Projects piloting mobile communication interventions e.g. health applications on smartphones, text messages, online profiling of personalised sexual behaviour health risk, anonymous online communication of test results, are slowly starting up and should be adapted for adolescents. So far, systematic reviews have shown that computer-based interventions can yield moderate effects improving sexual health.[16] Clearly, more evidence is needed into successful m-health interventions.[17] Ideally, such interventions will link into care, counselling and face-to-face contact with health professionals.

In summary, the article by Kerubo et al. shows only the tip of the iceberg of the need for good sexual health in Kenya and draws our attention to the overall burden of adolescent sexual health worldwide. We urgently need to do better especially for vulnerable adolescents and for adolescents in settings with high STI prevalence such as demonstrated in this study. An investment in the sexual health of adolescents is key for the success of the post-2015 development goals.[18]

Reference List

 1. Blum RW, Bastos FI, Kabiru CW, Le LC: Adolescent health in the 21st century. *Lancet* 2012, 379: 1567-1568.

 2. Every woman every child: The global strategy for women's, children's and adolescents health (2016-2030): Survive, thrive, transform. http://*www.everywomaneverychild.org/resources/publications* Accessed Jan 5th, 2016.

 3. Chandra-Mouli V, Svanemyr J, Amin A, Fogstad H, Say L, Girard F *et al*.: Twenty years after International Conference on Population and Development: where are we with adolescent sexual and reproductive health and rights? *J Adolesc Health* 2015, 56: S1-S6.

 4. The Rutgers Stichting: What we do: comprehensive sexuality education. *http://www.rutgers.international/what-we-do/comprehensive-sexuality-education/what-comprehensive-sexuality-education* Accessed Jan 5th, 2016.

 5. Kirby D: Emerging Answers 2007: New research findings on programs to reduce teen pregnancy - Full report. Wahsington, DC. *The National Campaign to Prevent Teen and Unplanned Pregnancy* 2007.

 6. Alford S: Science and Success: sex education and other programs that work to prevent teen pregnancy, HIV, and sexually transmitted infections. 2012. [*http://www*](http://www)*.advocatesforyouth.org/storage/advfy/documents/thirdeditionexecutivesummary.pdf* Accessed Jan 5th, 2016.

 7. WHO regional Office for Europe: Standards for sexuality education in Europe. [*http://www*](http://www)*.bzga-whocc.de/?uid=20c71afcb419f260c6afd10b684768f5&id=home* Accessed Jan 5th, 2016.

 8. Chandra-Mouli V, Lane C, Wong S: What Does Not Work in Adolescent Sexual and Reproductive Health: A Review of Evidence on Interventions Commonly Accepted as Best Practices. *Glob Health Sci Pract* 2015, 3: 333-340.

 9. UNFPA. State of the World Population. The power of 1.8 billion -adolescents, youth, and the transformation of the future. 2014.

 10. UNAIDS: AIDS Epidemic Update. December 2013. Joint United Nations Programme on HIV/AIDS. [*http://www.unaids.org/en/resources/campaigns/globalreport2013/globalreport*](http://www.unaids.org/en/resources/campaigns/globalreport2013/globalreport)

 11. Dellar RC, Dlamini S, Karim QA: Adolescent girls and young women: key populations for HIV epidemic control. *J Int AIDS Soc* 2015, 18: 19408.

 12. Djomand G, Gao H, Singa B, Hornston S, Bennett E, Odek J *et al*.: Genital infections and syndromic diagnosis among HIV-infected women in HIV care programmes in Kenya. *Int J STD AIDS* 2016, 27: 19-24.

 13. DiClemente RJ, Swartzendruber AL, Brown JL: Improving the validity of self-reported sexual behavior: no easy answers. *Sex Transm Dis* 2013, 40: 111-112.

 14. Braunstein SL, Ingabire CM, Kestelyn E, Uwizera AU, Mwamarangwe L, Ntirushwa J *et al*.: High human immunodeficiency virus incidence in a cohort of Rwandan female sex workers. *Sex Transm Dis* 2011, 38: 385-394.

 15. Lim MS, Hocking JS, Aitken CK, Fairley CK, Jordan L, Lewis JA *et al*.: Impact of text and email messaging on the sexual health of young people: a randomised controlled trial. *J Epidemiol Community Health* 2012, 66: 69-74.

 16. Bailey JV, Murray E, Rait G, Mercer CH, Morris RW, Peacock R *et al*.: Computer-based interventions for sexual health promotion: systematic review and meta-analyses. *Int J STD AIDS* 2012, 23: 408-413.

 17. Gkatzidou V, Hone K, Sutcliffe L, Gibbs J, Sadiq ST, Szczepura A *et al*.: User interface design for mobile-based sexual health interventions for young people: design recommendations from a qualitative study on an online Chlamydia clinical care pathway. *BMC Med Inform Decis Mak* 2015, 15: 72.

 18. Laski L: Realising the health and wellbeing of adolescents. *BMJ* 2015, 351: h4119.