Increases in Condomless Sex in the Swiss HIV Cohort Study

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Condomless sex is a key driver of sexually transmitted diseases. In this study, we assess the long-term changes (2000–2013) of the occurrence of condomless sex among human immunodeficiency virus (HIV)-infected individuals enrolled in the Swiss HIV Cohort study. The frequencies with which HIV-infected individuals reported condomless sex were either stable or only weakly increasing for 2000–2008. For 2008–2013, these rates increased significantly for stable relationships among heterosexuals and men who have sex with men (MSM) and for occasional relationships among MSM. Our results highlight the increasing public health challenge posed by condomless sex and show that condomless sex has been increasing even in the most recent years.

Keywords. condomless sex; HIV transmission; STI prevention; STI transmission.

Antiretroviral therapy (ART) has dramatically reduced mortality and has also been shown to block human immunodeficiency virus (HIV) transmission from individuals on ART [1]. According to the statement from the Swiss Federal Commission on HIV/acquired immune deficiency syndrome in 2008, persons on ART with undetectable virus load and no other sexually transmitted infections (STIs) can have condomless sex in a stable relationship without risking the infection of their partner (“Swiss statement”) [2]. This was also one of the first worldwide recommendations based on the now accepted effect of treatment as prevention [3]. Accordingly, it has been suggested that this recommendation would lead to an increase in condomless sex [4]. Such an increase was indeed found in a previous publication from the Swiss HIV Cohort Study (SHCS) [5]. However, this analysis was limited to the years 2007–2009 because of administrative censoring in 2009 and because one of its main aims was to identify determinants of condomless sex (many of which were not measured in the SHCS before 2007).

In this study, we aim to complement the analysis from Hasse et al [5] by reporting the temporal changes of condomless sex for the entire time range from 2000 (start of systematic reporting of risk behavior) to 2013. This allowed us to address whether risk behavior was already increasing before 2008 and whether it kept increasing in recent years.

METHODS

The SHCS enrolls HIV-infected adults and has been approved by ethics committees of all participating institutions. Written informed consent for all participants was obtained.

Because this study aims to determine the level of condomless sex in the entire HIV-infected population captured by the SHCS, individuals were included in the analysis independently of their time of recruitment. In accordance with Hasse et al [5], we distinguish between sex with occasional and stable partners. For simplicity, but in contrast to Hasse et al [5], we consider only 2 transmission groups: heterosexuals and men who have sex with men [MSM]. In the analysis presented, we do not distinguish between male and female heterosexuals; in a sensitivity analysis, we found the same time trends for both sexes (results not shown). Individuals can contribute to the analysis with several follow-up visits. In each of the biannual follow-up visits, individuals were asked by a physician or a study-nurse if in the preceding 6 months (a) they had occasional partners, (b) they had sex with an occasional partner, and (c) how often they used condoms. If a and b were affirmed and c was not answered with “always”, this indicates condomless sex with an occasional partner for the corresponding time period. The analogous definition is used for condomless sex with a stable partner.

We use logistic regression models with calendar time as an explanatory variable to explain the temporal changes of
condomless sex. In contrast to Hasse et al [5], we do not aim to assess the factors driving the changes in condomless sex but merely to capture the temporal changes over the entire time window for which data on condomless sex were available. Accordingly, we only use univariable models (note that missing data of covariates in the multivariable model was one main reason for the limited time window in Hasse et al [5]). Calendar time is included as a linear covariate in the logistic regression. To allow different effects of time before and after the Swiss-statement (2008), we also fit a variant of the model in which (1) the impact of calendar time can change in 2008 and (2) the odds for condomless sex can increase discontinuously in 2008. Technically, this is modeled as a piece-wise linear model for the log odds. Because most individuals could contribute several time points, we use robust standard errors (with clusters corresponding to follow-up visits from the same individual).

RESULTS

We analyzed responses to 162,405 questionnaires from 12,328 patients from the SHCS. Patients contributed a median (interquartile range [IQR]) of 12 (5–21) questionnaires and 6.8 (IQR, 2.6–12.5) years between the first and the last questionnaire. Overall, we find that the increase in condomless sex, previously observed for the time window of 2007–2009 [5], continues beyond this time window, but that this trend varies substantially across transmission groups and type of contact (occasional/stable partnership).

Both MSM and heterosexual HIV transmission groups exhibit increasing frequencies with which they report condomless sex in stable relationships after 2008 (see Figure 1). It is notable that the rates of condomless sex in stable relationships continue to increase substantially up to the end of the observation period (2013). Including calendar-year as a continuous variable in the logistic regression for the entire time range (2000–2013), yields an increase of the odds for condom-less sex in stable relationships of 1.14 [1.12–1.15]/year for MSM and 1.10 [1.08–1.11]/year for heterosexuals. If we allow for a different rate of increase for the years before and after the Swiss statement (2000–2007 vs 2008–2013), we find that the Swiss statement indeed is associated with an accelerated increase in condomless sex in stable relationships. For MSM, the odds of condomless sex increased by a factor of 1.03 (IQR, 1.00–1.05)/year before 2008 and by a factor of 1.19 (IQR, 1.16–1.21)/year from 2008 onwards. For heterosexuals, the odds for condom less sex decreased before 2008 (0.97 [IQR, 0.95–0.99]/year) and increased only from 2008 onwards (1.13 [IQR, 1.11–1.15]/year). Thus, in stable relationships, the Swiss statement has led to an accelerated increase of condomless sex in MSM and to a switch from decreasing to increasing rates of condomless sex in heterosexuals.

Figure 1. Frequency with which human immunodeficiency virus-infected individuals report unprotected sex over time (yearly average and 95% confidence interval). Dashed lines correspond to the fit of the piece-wise linear model to the frequencies of unprotected sex. Occasional and Stable refer to type of sexual partnership). The vertical dashed line indicates the level of condomless sex in 2008 (year of the Swiss Statement): 10.8% (men who have sex with men [MSM], stable), 6.0% (MSM, occasional), 15.9% (heterosexuals [HET], stable), and 1.0% (HET, occasional). The table displays the number of questionnaires evaluated for a given year and the number of patients responding to questionnaires in that year.
DISCUSSION

Overall, our results show a switch from a slow temporal increase or even a decrease in rates of condomless sex before the Swiss statement to an accelerated increase after the Swiss statement. For sex in stable relationships, this effect occurs in both MSM and heterosexuals, but for occasional sex, a substantial increase occurs only in MSMs. It is notable that the increase of condomless sex has continued until the end of the observation period and has reached values above 10% in all groups except occasional sex in heterosexuals. For MSM, we also observed (weak) increases in condomless sex over time and reach high levels of ∼15% in 2013, whereas rates of condomless sex in occasional partnerships remain low for heterosexuals (<2%) and exhibit only a weak increase over time.

Acknowledgments

We thank the patients who participated in the Swiss HIV Cohort Study (SHCS); the physicians and study nurses for excellent patient care; Brigitte Remy, Martin Rickenbach, F. Schoeni-Affolter, and Yannick Vallet from the SHCS Data Center in Lausanne for data management; and Danièle Perraudin and Mirjam Minichillo for administrative assistance.

Potential conflicts of interest. Confl...
References