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**Contraception use: is everything played at first intercourse?**

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**Contraception use: is everything played at first intercourse?**

For Preview Only

## Abstract

The rate of condom and other contraception use varies depending on social, personal and sexual characteristics. We present a study covering various contraceptive means, considering sexual orientation and considering a large panel of co-variables among Swiss resident young adults. Data were obtained from a self-administrated national survey on sexual behavior. Participants (N=4703, 49% males) were divided into three groups based on the mean of contraception used at last intercourse: CONDOM (55.1 %, 54.3% males), CONTRACEPTIVE (34.3 %, 43.1% males) and NON-USE (10.5%, 50.7% males). By gender, groups were compared on sociodemographic and personal characteristics, contraception used at first intercourse (FI) and sexual life. Globally, 90% of participants used a reliable contraception at last intercourse. Compared to the CONDOM group, participants in the CONTRACEPTIVE group were more likely to have already used a contraceptive at FI, and individuals in the NON-USE group were more likely to have had a non-use or to have used a contraceptive only at FI. Contraception at FI seems to have a considerable impact on the further use of contraception. It seems thus essential to

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3 make all necessary efforts in order to promote the best contraception and protection  
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7 at FI.  
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13 **Keywords:** Contraception; Condom; Last intercourse; First intercourse; Youths  
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17 **Abbreviations:** FI: first intercourse, MSM: men who have sex with  
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For Preview Only

## Introduction

Adolescents and young adults face various challenges as they experience biological, psychological and social changes at the same time (1). During this complex period, most youths are discovering and exploring their sexuality, in which the aspects of contraception and protection are essential to stay safe with a partner.

The rate of condom use at last intercourse allows quantifying the current use of contraception in individuals (2, 3). When looking at contraception use at last intercourse, studies have found several criteria influencing the choices of adolescents to protect themselves. For example: being a man (4, 5), having had no sexual intercourse in the last months (4), and a history of sexually transmitted infection (STI)(5, 6) seem to increase condom use. It was also the case in casual rather than steady relationship (4, 6) and when being single or having multiple partners concomitantly (4, 5). On the other hand, higher rates of contraception non-use have been found among youths with low friend or family support (4) and lower level of education (6). Another variable that seems to have an important influence on the recent contraception use of adolescents is the fact of having used a condom at first intercourse (FI) (4-7). Indeed condom use at FI has been linked to a higher rate of condom use at last intercourse (4, 7), during the month (6) or year (5) preceding the interview.

In this context, we were interested in investigating which contraception youths used at last intercourse and its determinants, particularly if the contraception used at FI had an influence on further contraceptive choices. To date, studies on the subject have mainly focused on condom use and on heterosexual intercourse, leaving out the other means of contraception as well as an often-ignored part of the population. The present study adds to the current knowledge on contraception use by covering various contraceptive means, considering sexual orientation and evaluating a large panel of variables.

## Methods

Data were collected in 2017 as part of a Swiss national study on youth sexual health and behaviors (8). This study provided self-reported information about sexual and reproductive health among young adults aged 24-26 years on the 30th of September 2016. This age range was selected in order to ensure that the majority of participants would be sexually active and, at the same time, sufficiently young to be able to recall accurately the beginning of their sexual life. The Federal Statistical Office provided the initial sample that was representative of the Swiss resident population in terms of sex, language (French, Italian or German) and canton of residence. We obtained their postal address, and an invitation letter was sent with an anonymous code to enter the online survey. The response rate was 15.1%. The final sample included 7142 participants (mean age 26.3 when completing the survey). To correct a slight over representation of females from the French speaking part of Switzerland, analyses were weighted by gender and canton of residence. Data were collected using a life history calendar (LHC) approach, a method that facilitates recall of past events (9, 10). Ethics clearance in agreement with Swiss law was given by the Ethics committee in research of the canton of Vaud. A detailed description of the survey method can be found elsewhere (8).

## Variables

### *Dependent variable*

A total of 4796 individuals answered the questions on contraception mean used at first and last sexual intercourse and were included in this study. As determinants of contraception use are likely to differ between women and men, due to social norms and access to different types of methods, we decided to analyses both genders separately.

The mean of contraception was inquired in form of a multiple answers question, including: nothing, male condom, female condom, contraceptive pill, hormonal vaginal ring, contraceptive

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3 patch, hormonal implant or injection, hormonal or copper intrauterine device, spermicides,  
4 withdrawal, natural methods (temperature, calendar), other (with free text option) and I don't  
5 know. The contraceptive methods were then assorted into three categories. The first one,  
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10 CONDOM, consisted of barrier methods (female and male condom), the second one,  
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12 CONTRACEPTIVE, included the highly effective contraceptives (pill, vaginal ring,  
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14 intrauterine device, implant and injection), the third category, NON-USE, consisted of non-use  
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16 and low effective methods (withdrawal, natural methods) (11). We removed 6 individuals that  
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18 answered "I don't know" to the question on contraception used at last intercourse and 50  
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20 individuals who had only had one intercourse in their life time, as the aim was to analyse the  
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22 evolution of contraception use through youths' sex life. All free text answers were recoded into  
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24 the previous categories. We decided to remove 13 persons that used spermicide because it could  
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26 not be considered as a high effective contraceptive but it could neither be included in the NON-  
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28 USE category (11). We excluded 5 individuals who identified themselves as neither masculine  
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30 nor feminine, as they could not be classified in any of our two categories, men or women  
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32 (Figure1). We assimilated the 1260 (26.8%) participants that had used a condom and a  
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34 contraceptive method at the same time in the CONDOM group as they were both protected  
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36 against sexually transmitted infections (STI) and unwanted pregnancies. The proportion of  
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38 participants using condom and another contraceptive at the same time were similar among men  
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40 (631; 26.9%) and women (629, 26.8%). The final sample consisted of 4703 participants (mean  
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42 age at time of survey:  $26.35 \pm 0.01$  years; 49% males)  
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3 The three groups were divided between into CONDOM (Men: n=1185 (55.5%); Women:  
4 n=1409 (59.8%)), CONTRACEPTIVE only (Men: n=916 (39.1%); Women: n=695 (29.5%))  
5 and NON-USE (Men: n=245 (10.5%); Women: n=252 (10.7%)).  
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### 8 9 10 *Independent variables* 11

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13 The question on contraception use at FI were similar to the question on contraception use at last  
14 intercourse. We proceeded the same way to form the three groups: condom, contraceptive and  
15 non-use at FI.  
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20 Socio-demographic characteristics included: gender, birth place of participant  
21 (Switzerland/other) and parents (at least one born in Switzerland/other), canton of residence  
22 being historically catholic or not, attained education level (tertiary/below), perceived family  
23 socioeconomic status (SES) at the age of 15 (dichotomized into average or above and below  
24 average,) (21).  
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32 Sexual orientation is a multidimensional and complex entity. Three variables were used to  
33 define it: self-identification, sexual attraction and sexual behavior, as recommended by other  
34 authors (12, 13). Self-identification was assessed through the question “How would you  
35 describe yourself?” with the following possibilities: heterosexual, homosexual, bisexual, I don’t  
36 know/I am not sure and other. Attraction was measured with the question “What best describes  
37 how you feel?” with possibilities ranging from attracted only to people of the same sex as me  
38 to attracted only to people of the opposite sex. Finally, the sexual behavior dimension was  
39 assessed with the partners’ sex with whom they performed diverse sexual acts (sexual contact,  
40 oral, vaginal or anal sex). Combining those three dimensions of sexual orientation allowed  
41 creating a variable distinguishing those being exclusively heterosexual (all aspects were  
42 reported as heterosexual) from those identified as non-exclusively heterosexual (at least one  
43 dimension was categorized as non-heterosexual).  
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3 We also looked at the characteristics and context of the participants' sex life. We asked  
4 participants to report their age at FI and the mean of contraception used. Then we enquired the  
5 number of lifetime sexual partners (grouped into 1 to 3 partners, 4 to 7 partners and 8 and more  
6 partners). Anal experience was assessed with a variable comparing those who had never tried  
7 anal intercourse versus those who experienced it at least once. Then we asked if the participant  
8 had ever had a STI diagnosed (yes/no), A history of positive STI testing was defined as a  
9 positive test for: HIV, HPV, Chlamydia, Herpes, Gonorrhea, Syphilis, Hépatits or  
10 Trichomoniasis(14, 15). The type of current relationship was grouped into one steady partner,  
11 one casual partner, two partners or more (being either casual or steady) and no relationship. The  
12 frequency of vaginal intercourse was dichotomized into more than once a week versus once a  
13 week and less.  
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29 Participants were able to choose the answer "I don't know" or "I don't want to answer" in  
30 various questions and those answers were considered missing values.  
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### 34 *Data analysis*

35 Analysis were carried out in men (N=2357) and women (N=2346) separately. First we ran a  
36 bivariate analysis comparing the three groups: CONDOM, CONTRACEPTIVE, NON-USE-.  
37 We used chi-square tests for categorical variables and ANOVA for continuous ones. Then,  
38 statistically significant variables at the bivariate level were entered into a multinomial  
39 regression analysis using the CONDOM group as the reference category. Results are given as  
40 relative risk ratios (RRR) with 95% confidence intervals are indicated.  
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50 We used STATA 14.0 (StataCorp, College Station, TX, USA) for all the analyses, with a  
51 significance level of  $p < 0.05$ .  
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## Results

Among the 4703 participants, 50.1% were males, 83.7% were exclusively heterosexual and their mean age was 26.3 years old at the time of the study. First intercourse occurred at a mean age of  $17.6 \pm 0.05$  years old.

### *Women*

Overall, 1185 (50.5%) women used a condom with or without contraceptive, 916 (39.1%) used a contraceptive method only and 245 (10.5%) did not use any contraception at their last intercourse.

### *Bivariate analysis (Table 1)*

***Sociodemographic and personal data.*** We found that family SES, being born in Switzerland, education level, living in Catholic canton and being exclusively heterosexual had a significant association with contraception choice at last intercourse. The NON-USE group was associated with characteristics often considered as an indicator of vulnerability and the CONTRACEPTIVE group with more favorable options of those variables.

***Sexual / relational life.*** Women in the contraceptive group were on average younger at FI, and at that time 85.2% participants used a condom, 8.3% a contraceptive only and 6.48% had a non-use. The current contraception method tended to be the same as the one used at FI. We noticed that being in a steady relationship, a higher number of lifetime sexual partners, the fact of having ever had anal intercourse and having intercourse more than once a week were more prevalent among the CONTRACEPTIVE group. Having more than one partner concomitantly was more likely among the NON-USE group.

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3 *Multivariate analysis (Table 2)*  
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6 Compared to participants in the CONDOM group, those in the CONTRACEPTIVE group were  
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8 more likely to have used a contraceptive only at their FI (RRR 2.57), to live in a Catholic canton  
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10 (RRR 1.31) and to have had their FI at a younger age (RRR 0.88). They were less likely to be  
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12 single (RRR 0.66) and more likely to have had anal intercourse (RRR 1.41) and to have sex  
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14 more than once a week (RRR 1.35)  
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18 Compared to participants in the CONDOM group, those in the NON-USE group were more  
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20 likely to have had a non-use (RRR 6.38) or to have used a contraceptive only (RRR 3.05) at  
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22 their FI. They were significantly more likely to be non-exclusively heterosexual (RRR 1.96), to  
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24 live in a Catholic canton (RRR 1.78), and to have an education level below tertiary (RRR 1.37)  
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26 and less likely to be single at the time of the study (RRR 0.40).  
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30 **Men**  
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33 Overall, 1409 (59.8%) male participants used a condom with or without contraceptive, 695  
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35 (29.5%) had a partner who used a contraceptive method only and 252 (10.7%) did not use any  
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37 contraception at their last intercourse.  
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40 *Bivariate analysis (Table 3)*  
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43 **Sociodemographic and personal data.** We found that family SES, being born in Switzerland  
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45 and being exclusively heterosexual had a significant association with contraception choice at  
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47 last intercourse. The NON-USE group was associated with characteristics often considered as  
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49 an indicator of vulnerability and the CONTRACEPTIVE group with more favorable options of  
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51 these variables.  
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55 **Sexual / relational life.** Participants in the CONDOM group were on average older at FI, and  
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57 back then 86% participants used a condom, 7.2% a contraceptive only and 6.8% had a non-use.  
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59 Participants in each group were more frequently using the same contraception that they had  
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3 used at FI, than the other methods. The NON-USE group was associated with a higher number  
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5 of lifetime sexual partners and having more than one partner concomitantly. The  
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7 CONTRACEPTIVE group was associated with being in a steady relationship and having ever  
8  
9 practiced anal intercourse.  
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#### 11 12 *Multivariate analysis (Table 4)*

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15 Compared to participants in the CONDOM group, men in the CONTRACEPTIVE group were  
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17 more likely to have used a contraceptive only (RRR 1.69) or to have had a non-use (RRR 1.96)  
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19 at their FI. Participants were more likely to live in a Catholic canton (RRR 1.34), to have had  
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21 their FI at a younger age (RRR 0.91), to have experienced anal intercourse (RRR 1.34) and to  
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23 have sex more than once a week (RRR 1.54). They were less likely to be non-exclusively  
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25 heterosexual (RRR 0.57), to be single at the time of interview (RRR 0.60) or to have 2 or more  
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27 partners concomitantly (RRR 0.63).  
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32 Compared to participants in the CONDOM group, those in the NON-USE group were more  
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34 likely to have had a non-use (RRR 8.09) or to have used a contraceptive only (RRR 2.06) at  
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36 their FI. They were also more likely to live in a Catholic canton (RRR 1.71).  
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#### 40 **Discussion**

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43 The majority of Swiss resident youths used some kind of contraception at FI and continued to  
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45 do so at last intercourse. Condom, with or without any other contraceptive, is the most common  
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47 mean of contraception among both men and women.  
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51 We note an important association between the mean of contraception used at last intercourse  
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53 and the one used at FI, which happened on average 9 years before this study. Like other studies  
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55 (4-7), we found a relation between condom use at FI and last intercourse. Moreover, we also  
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57 found that this observation holds for other means of contraception. Participants that had a non-  
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59 use at FI were, 6 times for women and 8 times for men, more likely to not use contraception at  
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3 last intercourse. Thus, participants tend to stick to their first mean of contraception. Those  
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5 results support that contraception choice at FI influences later contraception use.  
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8 Respondents reported less condom and more contraceptive only and non-use at age 26 than at  
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10 the time of FI. This could ensue from the fact that participants might be in quite different periods  
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12 of their life. At 26 years old, more participants may be in an exclusive and steady relationship,  
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14 allowing them to drop the protection part, the condom, and focus only on the contraceptive part  
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16 of contraception. On the other hand, more participants seeking pregnancy could explain the  
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18 increase in non-use. In this line, the fact that we observed a switch from contraceptive only at  
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20 FI to non-use at last intercourse in certain participants could be explained by steady couples  
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22 trying to conceive.  
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26 We observed gender differences in terms of determinants and prevalence of contraception use.  
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28 Men and women seem to have a different relation towards contraception, as we observed that  
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30 even though the prevalence of non-use was similar, the proportion of condom and contraceptive  
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32 only were different. Those differences could be due to joint influences. First, contraception is  
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34 generally considered a female responsibility, especially to avoid unwanted pregnancies (16-18),  
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36 even though men seem to share more of this duty in long term relationships(19). Second, they  
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38 do not deal with the same potential consequences of a contraception fail. Women face more  
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40 direct consequences of an unwanted pregnancy, and even though men are also concerned by  
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42 the infection risk, women are more susceptible to STI due to anatomical differences (20, 21).  
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44 Third, they do not have direct access to the same type of contraception. Since the male  
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46 contraceptive pill is still not available, only one reliable and reversible method is currently  
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48 offered to men, the condom (22, 23). Women, on the other hand, have access to a large panel  
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50 of reliable contraceptive devices but if they want to use a condom they need to have a partner  
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52 willing to put it on (27, 28). That may lead to a more difficult access to STI protection for  
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54 women and an under report of contraceptive mean by men who may not know what their female  
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3 partner is using. Moreover, discussing contraception use with one's partner could be a sensitive  
4 topic(24). Both partners need to discuss, and get involved in this discussion. It has been shown  
5 that in countries with better gender equality, the contraception rate is higher (20), certainly due  
6 to the more active role women could take in the decision-making process. All these reasons  
7 could explain why, in our study, women reported more contraceptive use only and less condom  
8 use than men.  
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11 Women having a non-use of contraception were more likely to identify as non-exclusively  
12 heterosexual. Among them are women engaged in same sex intercourse, who therefore do not  
13 need any contraceptive, as no pregnancy is possible, but against infectious diseases, barrier  
14 protection, like dental dam, is still recommended(25). Unfortunately, those devices are less  
15 promoted, more unknown to the general public(26) and generally hard to find, because not  
16 available in the majority of pharmacies, supermarkets or sex shops. Moreover, sexual education  
17 and prevention focuses essentially on vaginal intercourse for heterosexual individuals, anal  
18 intercourse for men who have sex with men (MSM) and the sexuality of non-heterosexual  
19 women is often left apart. This could explain why they use less protection. Concerning men,  
20 we did not find any similar results at the multivariate level linking non-heterosexuality to non-  
21 use of contraception, even though it seems to be the case at the bivariate level. Since HIV, has  
22 changed from a fatal to a chronic disease a decline of condom use has been observed(5), but we  
23 do not seem to confirm it here.  
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48 Women in the non-use group were less likely to have attained a tertiary education level. Although  
49 literature has showed that this may be due to social vulnerability(6), we could imagine that  
50 those women are more likely to be trying to get pregnant, since they are in financially more  
51 stable, compared to women who went through tertiary studies and are just starting their  
52 professional life or may still be students at age 26.  
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3 Both men and women living in Catholic cantons were overrepresented in contraceptive only  
4 and non-use groups. This might be explained by differences in cultural background and sexual  
5 education that could be more conservative in Catholic regions, as Catholicism is one of the  
6 strictest religions in terms of contraception use (27). The increased proportion of people living  
7 in Catholic cantons among the non-user group might be explained by this cultural influence  
8 present in the form of social norms, sexual education or parent's non-approval of contraception  
9 use and sexual intercourse. Moreover, among this population there could be participants  
10 wanting to become pregnant and practicing intercourse only with this purpose or wanting to  
11 rely on "God's will" for their contraception due to their religious affiliation. Furthermore, the  
12 higher proportion among the contraceptive only user could be due to the fact that, unlike  
13 condoms, the pill can be used for other reasons than contraception, like regulation of menses or  
14 dysmenorrhea. In this perspective we can assume that participants could justify using a  
15 contraceptive method for reasons not related to sex. In the context of living in a region with a  
16 religion that disapproves contraception, all those reasons could play a role in the fact that  
17 participants report either non-use or contraceptive only at last intercourse. There is still some  
18 work to do regarding sex education and deconstructing social or religious norms in order to  
19 allow contraception access to all youths irrespective of their place of living's main religion.  
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42 Contrary to an American study (7), we found a difference in sexual frequency between our  
43 groups. Men and women having intercourse more than once a week were overrepresented in  
44 the contraceptive only group. We can imagine that when participants are engaged in regular  
45 and frequent intercourse, with a steady partner, they seek a more perennial contraceptive mean.  
46 Like others (4, 5) we also found a link between being single or having more than two partners  
47 concomitantly with increased condom use, which is reassuring as participants were protected  
48 against infections in the event of intercourse with new or multiple partners.  
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3 Almost half of participants, independently of gender, were exclusively heterosexual or not had  
4 practiced anal intercourse. Men and women who had tried anal intercourse, at least once were  
5 more likely to use contraceptive only. Anal intercourse among MSM is well known, but often  
6 left apart in studies or underreported among heterosexuals (28, 29). According to a systematic  
7 review on the subject, the proportion of youths engaged in anal intercourse varies from 0 to  
8 49% (30), and our study found a proportion on the upper margin of this interval. STI  
9 transmission and especially HIV is more frequent during anal than vaginal intercourse due to  
10 anatomical differences (28). The risk of HIV transmission through anal intercourse is well  
11 known among MSM, but it is rarely brought up among heterosexuals. It seems fundamental to  
12 spread the information that condom is necessary to prevent any STI infection during anal  
13 intercourse even among the heterosexual population. Health professionals should address the  
14 subject and offer STI screening to heterosexuals that practice anal intercourse.

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16 Unlike others, we did not find a link between a history of STI (5, 6) and non-use of condom.  
17 Nevertheless we observed that women were twice more likely to report a history of STI than  
18 men, certainly because women are offered regular screening in the context of their  
19 gynecological follow-up. Unfortunately, there is not such a generalization of screening among  
20 men. A method should be found to promote regular screening among asymptomatic men, and  
21 help reduce the potential spread of STI.

### 22 23 24 **Strengths and Limitations**

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26 The strength of this study is the sample size, which offered a representative sample of young  
27 adults living in Switzerland. Moreover, data were weighted by gender and canton of residence  
28 to ensure the representativeness of this population. Furthermore, unlike most studies, we  
29 considered various types of contraception and both genders with further differentiating by  
30 sexual orientation.



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3 However, some limitations need to be put forward. First, the response rate was low, even though  
4 this rate is similar to the 20 % response rate reported in a Danish survey using almost exactly  
5 the same methodology (31). This may be explained by the fact that sexuality is a sensitive issue  
6 and that participants may not be at ease answering through the web, even if the access to the  
7 questionnaire was secured and anonymity was granted. Moreover, we could only contact  
8 participants through postal mail and having to connect to the website and introduce a code might  
9 have reduced the likelihood to answer compared to having received the invitation electronically.  
10 Additionally, the survey was launched right before the Swiss summer holidays, which might  
11 also have reduced the response rate. As we were aware of these potential issues, we decided to  
12 start with a very large sample so that the final sample would be large enough for statistical  
13 purposes. Second, we asked participants with a mean age of 26.3 years at the time of survey to  
14 remember their FI and other past sexual events. It is possible that we have faced some recall  
15 bias, although asking the question at the age of 26 gives them an important temporal  
16 perspective. As explained in the methods, we tried to minimize recall bias by using the LHC  
17 method approach (9, 10), and by allowing participant to choose “I don’t know or remember” if  
18 they were unsure of the answer. Third, the question on contraception use did not specify the  
19 gender of the partner nor whether the intercourse was vaginal or anal. Fourth, the exact age at  
20 last intercourse was not asked in the questionnaire, so the age at study was used as equivalent.  
21 Fifth, this was a cross sectional study and no causation can be inferred. Nevertheless, although  
22 it was cross-sectional, these retrospective data allowed us to identify events that happened  
23 before or after FI, and to explore its context.

## 52 **Conclusion**

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55 Globally almost 90% of participants used a type of reliable contraception at last intercourse.  
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57 The rate of condom use could be improved, but when participants are in a steady relationship  
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3 and went through STI screening, they can safely rely on a contraceptive only method.  
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5 Contraception at FI does have a considerable impact on the further use of contraception. Youths  
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7 seem to stick to the mean of contraception they first used. Regarding this fact, it seems essential  
8  
9 to make all necessary efforts in order to promote the best contraception and protection at FI,  
10  
11 which are condoms, completed or not with a contraceptive. Moreover, particular attention  
12  
13 should be put towards encouraging women and men to take an active role in the decision-  
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15 making process with their partners in order to reduce gender differences in terms of  
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17 contraception use and access. In addition, health practitioners need to ask patients about their  
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19 sexual practices regardless of their sexual orientation or gender, in order to direct every  
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21 individual to the most fitting contraception or protection they need and to spread the best  
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23 possible prevention message. In this sense, health professionals should encourage condom use  
24  
25 and STI screening among heterosexual youths practicing anal sex.  
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34 **Conflict of interest:** All authors have indicated they have no potential conflicts of interest to  
35 disclose.  
36

37 **Funding:** This work was supported by the Swiss National Science Foundation [grant 162538].  
38  
39 The sponsor source had no role in the study design, collection of data, data analysis and  
40  
41 interpretation of results, the writing of the manuscript, and the decision to submit the manuscript  
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43 for publication.  
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Figure 1: Study flow chart

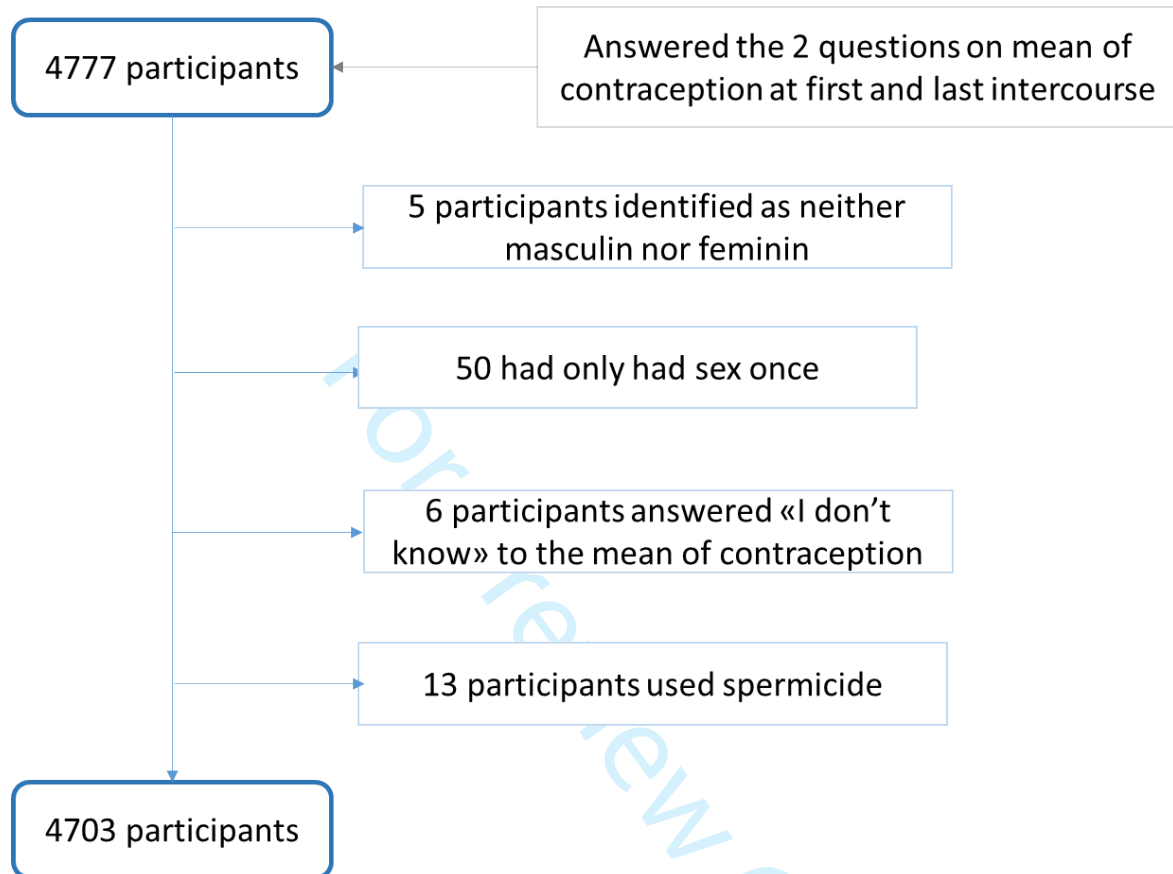


Table 1: Bivariate analysis of sociodemographic and personal characteristics according to contraception used at last intercourse among women

Variables	Total N=2346	CONDOM N= 1185 (50.5%)	CONTRACEPTIVE N= 916 (39.1%)	NON-USE N = 245 (10.5%)	P Value
Age at study time (mean±SD)	26.33 ± 0.02	26.34 ± 0.02	26.31 ± 0.03	26.34 ± 0.06	0.60
<b>Sociodemographic and personal data</b>					
Family SES (below average)	16.3	16.3	15.2	20.2	0.14
Birth place (foreign)	11.9	12.3	10.3	15.9	< 0.05
Parents birth place (2 parents foreign born)	16.9	16.6	15.7	23.0	< 0.05
Residence in a Catholic canton	22.7	20.6	24.0	27.9	< 0.05
Attained education level (below tertiary)	44.3	43.2	44.0	50.9	0.06
Sexual orientation (non-heterosexual)	19.1	17.9	17.4	31.4	< 0.01
<b>Sexual / relational life</b>					
Age at first intercourse (mean±SD)	17.44 ± 0.05	17.84 (± 0.08)	16.09(± 0.07)	17.51 (± 0.19)	< 0.01
Contraception used at first intercourse					
Condom	85.2	90.8	84.2	62.4	< 0.01
Contraceptive	8.3	5.4	11.8	9.3	
Non-use	6.5	3.9	4.0	28.4	
Number of lifetime sexual partners					
1-3	39.3	42.5	34.5	42.0	< 0.01
4-7	26.8	25.7	28.7	25.1	
8 and more	33.9	31.8	36.9	33.0	
Anal intercourse (at least once)	48.93	43.2	56.3	48.8	< 0.01
History of STI	13.7	11.9	16.3	12.2	< 0.01
Type of relationship with actual partner(s)					

Single	14.0	16.8	10.0	15.5	< 0.01
1 steady partner	74.6	71.9	78.8	71.9	
1 casual partner	6.4	6.2	6.8	5.9	
2 or more partners	5.0	5.1	4.5	6.8	
Frequency of vaginal intercourse (more than once a week)	49.3	45.1	54.6	49.7	< 0.01

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Table 2: Multivariate analysis of sociodemographic and personal characteristics by contraception used at last intercourse among women

Variables	CONTRACEPTIVE RRR ( 95% CI)	NON-USE RRR ( 95% CI)
Mean age	0.94 (0.85-1.05)	1.01 (0.85-1.19)
Family SES (below average)	0.91 (0.70-1.17)	1.24 (0.83-1.84)
Birth place (foreign)	0.74 (0.51-1.08)	1.08 (0.57-2.07)
Parents birth place (2 parents foreign born)	1.17 (0.85-1.62)	1.43 (0.80-2.56)
Reidence in a Catholic canton	1.31* (1.05-1.63)	1.78** (1.27-2.49)
Attained study level ( below tertiary)	1.00 (0.83-1.20)	1.37* (1.01-1.88)
Sexual orientation (non-heterosexual)	0.90 (0.70-1.14)	1.96** (1.37-2.80)
Age at FI	0.88** (0.85-0.92)	1.01 (0.95-1.07)
Contraception used at first intercourse		
Contraceptive	2.57** (1.82-3.63)	3.05** (1.80-5.16)
non-use	1.18 (0.73-1.90)	6.38** (3.94-10.34)
Number of lifetime sexual partners		
4-7	1.26 (0.99-1.61)	1.21 (0.81-1.81)
8 and more	1.11 (0.86-1.44)	1.23 (0.79-1.90)
Anal intercourse (at least once)	1.41** (1.16-1.71)	1.34 (0.98-1.84)
History of STI (self or partner)	1.17 (0.91-1.52)	1.04 (0.66-1.62)
Type of relationship with actual partner.s		
1 casual partner	1.01 (0.69-1.47)	0.99 (0.52-1.87)
2 or more partners	0.71 (0.45-1.12)	1.15 (0.61-2.17)
single	0.66** (0.49-0.89)	0.40** (0.23-0.71)
frequency of vaginal intercourse ( more than once a week)	1.35** (1.12-1.64)	1.22 (0.89-1.67)

\*P< 0.05; \*\*P< 0.01



Table 3: Bivariate analysis of sociodemographic and personal characteristics according to contraception used at last intercourse among women

Variables	Total N=2357	CONDOM N= 1409 (59.8%)	CONTRACEPTIVE N= 695 (29.5%)	NON-USE N = 252 (10.7%)	P Value
Age at study time (mean±SD)	26.37 ± 0.02	26.35 ± 0.03	26.40 ± 0.04	26.42± 0.06	0.20
<b>Sociodemographic and personal data</b>					
Family SES (below average)	14.2	15.3	10.9	17.6	< 0.05
Birth place (foreign)	11.0	11.1	8.8	16.1	< 0.05
Parents birth place (2 parents foreign born)	16.1	16.4	13.4	21.6	< 0.05
Residence in a Catholic canton	22.9	21.1	25.1	26.9	0.06
Attained education level (below tertiary)	53.8	52.0	55.9	58.5	0.13
Sexual orientation (non-heterosexual)	13.4	14.9	7.7	21.1	< 0.01
<b>Sexual / relational life</b>					
Age at first intercourse (mean±SD)	17.79 ± 0.08	18.15 ± 0.10	17.23 ± 0.12	17.45 ± 0.27	< 0.01
Contraception used at first intercourse					
Condom	86.0	91.1	83.0	65.6	< 0.01
Contraceptive	7.2	5.3	10.9	7.7	
Non-use	6.8	3.6	6.2	26.7	
Number of lifetime sexual partners					
1-3	35.2	37.1	30.1	38.3	< 0.01
4-7	27.9	28.6	29.3	19.6	
8 and more	37.0	34.3	40.7	42.1	
Anal intercourse (at least once)	48.4	44.6	55.1	50.4	< 0.01
History of STI	6.2	6.0	6.4	6.8	0.89
Type of relationship with actual partner(s)					
Single	19.5	22.4	12.6	22.3	< 0.01
1 steady partner	65.5	61.6	75.8	59.3	
1 casual partner	5.9	6.7	4.7	4.7	
2 or more partners	9.1	9.3	7.0	13.6	
Frequency of vaginal intercourse (more than once a week)	51.4	45.1	62.4	54.7	< 0.01

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Table 4: Multivariate analysis of sociodemographic and personal characteristics by contraception used at last intercourse among men

Variables	CONTRACEPTIVE RRR ( 95% CI)	NON-USE RRR ( 95% CI)
Mean age	1.08 (0.93-1.24)	1.12 (0.89-1.40)
Family SES (below average)	0.59** (0.41-0.85)	0.88 (0.51-1.50)
Birth place (foreign)	1.02 (0.59-1.78)	1.45 (0.66-3.18)
Parents birth place (2 parents foreign born)	0.65 (0.41-1.05)	0.93 (0.45-1.90)
Reidence in a Catholic canton	1.34* (1.02-1.77)	1.71* (1.11-2.63)
Attained study level ( below tertiary)	1.14 (0.90-1.45)	1.22 (0.82-1.81)
Sexual orientation (non-heterosexual)	0.57* (0.37-0.89)	0.79 (0.43-1.47)
Age at FI	0.91** (0.87-0.96)	0.94 (0.87-1.02)
Contraception used at first intercourse		
Contraceptive	1.69* (1.08-2.67)	2.06* (1.06-4.02)
non-use	1.96* (1.16-3.30)	8.09** (4.42-14.78)
Number of lifetime sexual partners		
4-7	1.17 (0.86-1.61)	0.69 (0.40-1.19)
8 and more	1.33 (0.94-1.86)	0.98 (0.57-1.70)
Anal intercourse (at least once)	1.34* (1.04-1.73)	1.04 (0.67-1.62)
History of STI (self or partner)	1.07 (0.66-1.75)	0.87 (0.36-2.08)
Type of relationship with actual partner.s		
1 casual partner	0.58 (0.33-1.01)	1.09 (0.49-2.44)
2 or more partners	0.63* (0.39-0.99)	1.83 (0.95-3.54)
single	0.60** (0.41-0.88)	0.71 (0.38-1.32)
frequency of vaginal intercourse ( more than once a week)	1.54** (1.18-2.01)	1.48 (0.95-2.28)

\*P< 0.05; \*\*P< 0.01

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4 **Contraception use: is everything played at first intercourse?**  
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9 Marion Meuwly M.Med.  
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12 Yara Barrense-Dias PhD  
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16 Diane Auderset M.A.  
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58 **Figures: 1**

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60 **Tables: 4**

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3 Dear Editor,

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5 Thank for allowing us to submit a revised version of our manuscript *Contraception use: is everything*  
6 *played at first intercourse?* We have addressed the reviewers' comments as follows and have  
7 highlighted the changes in the manuscript.  
8

9 **Reviewer: 1**

10 **Comments to the Author**

11  
12  
13 **The present study investigated youths contraception use at last intercourse and its determinants.**  
14 **The sample size and the large panel of variables covered are among the strengths of the study,**  
15 **however the most relevant strength is the fact that it considers sexual orientation (defined by**  
16 **three variables: self-identification, sexual attraction and sexual behavior).**  
17

18 *We thank the reviewer for this comment.*

19  
20 **Results support what is already known that contraception choice at first intercourse influences**  
21 **later contraception use.**  
22

23 **Some minor changes are proposed:**

24  
25 - The sentence "Since HIV, has changed from a fatal to a chronic disease a decline of condom use  
26 has been observed (Gremy and Beltzer 2004), but we do not seem to confirm it here." should be  
27 written without a comma.  
28

29 *We have corrected it.*

30  
31 - Some of the statements in the conclusion section are not directly driven by the results of this  
32 study. On the other hand, statements made in the Discussion, such as "It seems fundamental to  
33 spread the information that condom is necessary to prevent any STI infection during anal  
34 intercourse even among the heterosexual population. Health professionals should address the  
35 subject and offer STI screening to heterosexuals that practice anal intercourse." could well come in  
36 the Conclusion.  
37

38  
39 *We thank the reviewer for this comment. We have left the statement in the Discussion as it originally*  
40 *was because we believe that otherwise part of the argumentation is lost. However, we have added a*  
41 *sentence in this sense at the end of the Conclusions.*  
42

43 **Reviewer 2**

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45 **REVISE ALL THE REFERENCES TO VANCOUVER SYSTEM.....you should know this by now for this**  
46 **journal**

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48 *We have corrected it, sorry for this mistake.*  
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52 We look forward to hearing from you.  
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Figure 1: Study flow chart

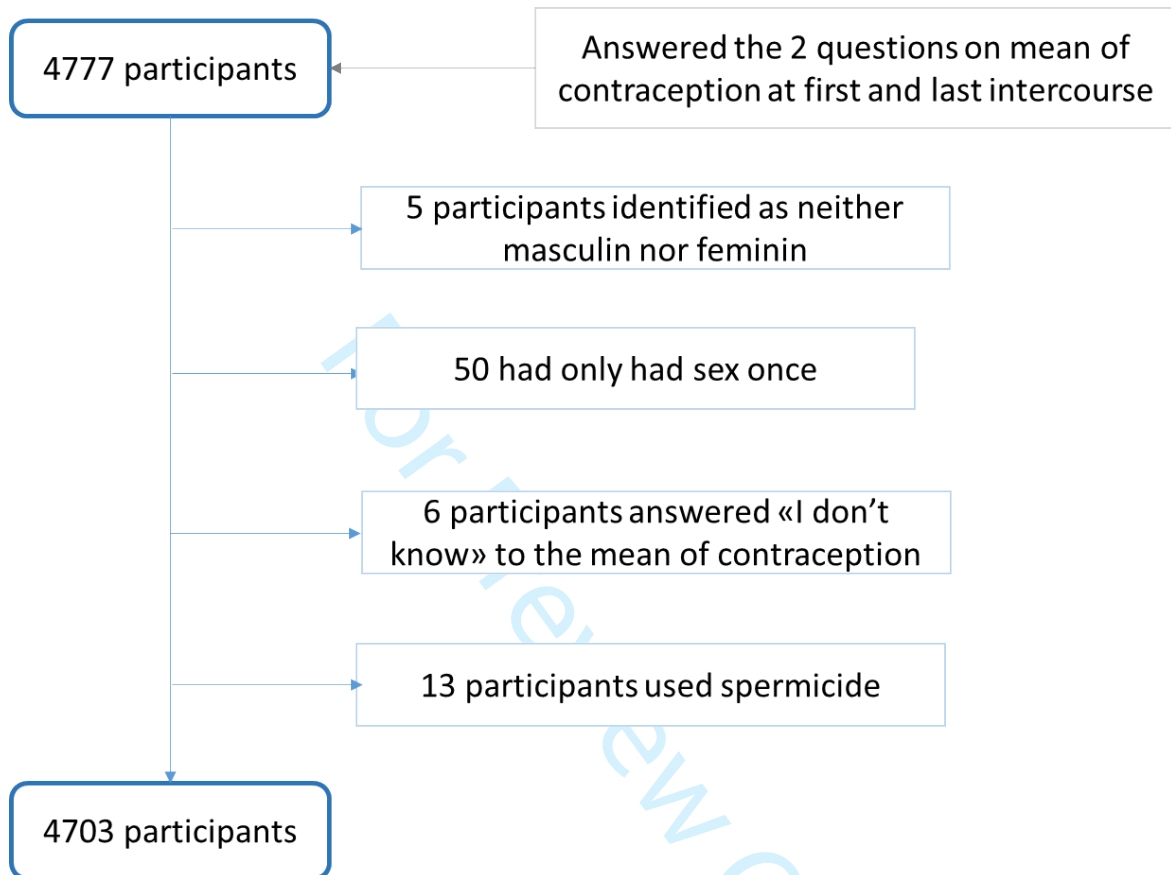


Table 1: Bivariate analysis of sociodemographic and personal characteristics according to contraception used at last intercourse among women

Variables	Total N=2346	CONDOM N= 1185 (50.5%)	CONTRACEPTIVE N= 916 (39.1%)	NON-USE N = 245 (10.5%)	P Value
Age at study time (mean±SD)	26.33 ± 0.02	26.34 ± 0.02	26.31 ± 0.03	26.34 ± 0.06	0.60
<b>Sociodemographic and personal data</b>					
Family SES (below average)	16.3	16.3	15.2	20.2	0.14
Birth place (foreign)	11.9	12.3	10.3	15.9	< 0.05
Parents birth place (2 parents foreign born)	16.9	16.6	15.7	23.0	< 0.05
Residence in a Catholic canton	22.7	20.6	24.0	27.9	< 0.05
Attained education level (below tertiary)	44.3	43.2	44.0	50.9	0.06
Sexual orientation (non-heterosexual)	19.1	17.9	17.4	31.4	< 0.01
<b>Sexual / relational life</b>					
Age at first intercourse (mean±SD)	17.44 ± 0.05	17.84 (± 0.08)	16.09(± 0.07)	17.51 (± 0.19)	< 0.01
Contraception used at first intercourse					
Condom	85.2	90.8	84.2	62.4	< 0.01
Contraceptive	8.3	5.4	11.8	9.3	
Non-use	6.5	3.9	4.0	28.4	
Number of lifetime sexual partners					
1-3	39.3	42.5	34.5	42.0	< 0.01
4-7	26.8	25.7	28.7	25.1	
8 and more	33.9	31.8	36.9	33.0	
Anal intercourse (at least once)	48.93	43.2	56.3	48.8	< 0.01
History of STI	13.7	11.9	16.3	12.2	< 0.01
Type of relationship with actual partner(s)					
Single	14.0	16.8	10.0	15.5	< 0.01
1 steady partner	74.6	71.9	78.8	71.9	
1 casual partner	6.4	6.2	6.8	5.9	
2 or more partners	5.0	5.1	4.5	6.8	
Frequency of vaginal intercourse (more than once a week)	49.3	45.1	54.6	49.7	< 0.01



Table 2: Multivariate analysis of sociodemographic and personal characteristics by contraception used at last intercourse among women

Variables	CONTRACEPTIVE RRR ( 95% CI)	NON-USE RRR ( 95% CI)
Mean age	0.94 (0.85-1.05)	1.01 (0.85-1.19)
Family SES (below average)	0.91 (0.70-1.17)	1.24 (0.83-1.84)
Birth place (foreign)	0.74 (0.51-1.08)	1.08 (0.57-2.07)
Parents birth place (2 parents foreign born)	1.17 (0.85-1.62)	1.43 (0.80-2.56)
Reidence in a Catholic canton	1.31* (1.05-1.63)	1.78** (1.27-2.49)
Attained study level ( below tertiary)	1.00 (0.83-1.20)	1.37* (1.01-1.88)
Sexual orientation (non-heterosexual)	0.90 (0.70-1.14)	1.96** (1.37-2.80)
Age at FI	0.88** (0.85-0.92)	1.01 (0.95-1.07)
Contraception used at first intercourse		
Contraceptive	2.57** (1.82-3.63)	3.05** (1.80-5.16)
non-use	1.18 (0.73-1.90)	6.38** (3.94-10.34)
Number of lifetime sexual partners		
4-7	1.26 (0.99-1.61)	1.21 (0.81-1.81)
8 and more	1.11 (0.86-1.44)	1.23 (0.79-1.90)
Anal intercourse (at least once)	1.41** (1.16-1.71)	1.34 (0.98-1.84)
History of STI (self or partner)	1.17 (0.91-1.52)	1.04 (0.66-1.62)
Type of relationship with actual partner.s		
1 casual partner	1.01 (0.69-1.47)	0.99 (0.52-1.87)
2 or more partners	0.71 (0.45-1.12)	1.15 (0.61-2.17)
single	0.66** (0.49-0.89)	0.40** (0.23-0.71)
frequency of vaginal intercourse ( more than once a week)	1.35** (1.12-1.64)	1.22 (0.89-1.67)

\*P< 0.05; \*\*P< 0.01

Table 3: Bivariate analysis of sociodemographic and personal characteristics according to contraception used at last intercourse among women

Variables	Total N=2357	CONDOM N= 1409 (59.8%)	CONTRACEPTIVE N= 695 (29.5%)	NON-USE N = 252 (10.7%)	P Value
Age at study time (mean±SD)	26.37 ± 0.02	26.35 ± 0.03	26.40 ± 0.04	26.42± 0.06	0.20
<b>Sociodemographic and personal data</b>					
Family SES (below average)	14.2	15.3	10.9	17.6	< 0.05
Birth place (foreign)	11.0	11.1	8.8	16.1	< 0.05
Parents birth place (2 parents foreign born)	16.1	16.4	13.4	21.6	< 0.05
Residence in a Catholic canton	22.9	21.1	25.1	26.9	0.06
Attained education level (below tertiary)	53.8	52.0	55.9	58.5	0.13
Sexual orientation (non-heterosexual)	13.4	14.9	7.7	21.1	< 0.01
<b>Sexual / relational life</b>					
Age at first intercourse (mean±SD)	17.79 ± 0.08	18.15 ± 0.10	17.23 ± 0.12	17.45 ± 0.27	< 0.01
Contraception used at first intercourse					
Condom	86.0	91.1	83.0	65.6	< 0.01
Contraceptive	7.2	5.3	10.9	7.7	
Non-use	6.8	3.6	6.2	26.7	
Number of lifetime sexual partners					
1-3	35.2	37.1	30.1	38.3	< 0.01
4-7	27.9	28.6	29.3	19.6	
8 and more	37.0	34.3	40.7	42.1	
Anal intercourse (at least once)	48.4	44.6	55.1	50.4	< 0.01
History of STI	6.2	6.0	6.4	6.8	0.89
Type of relationship with actual partner(s)					
Single	19.5	22.4	12.6	22.3	< 0.01
1 steady partner	65.5	61.6	75.8	59.3	
1 casual partner	5.9	6.7	4.7	4.7	
2 or more partners	9.1	9.3	7.0	13.6	
Frequency of vaginal intercourse (more than once a week)	51.4	45.1	62.4	54.7	< 0.01

Table 4: Multivariate analysis of sociodemographic and personal characteristics by contraception used at last intercourse among men

Variables	CONTRACEPTIVE RRR ( 95% CI)	NON-USE RRR ( 95% CI)
Mean age	1.08 (0.93-1.24)	1.12 (0.89-1.40)
Family SES (below average)	0.59** (0.41-0.85)	0.88 (0.51-1.50)
Birth place (foreign)	1.02 (0.59-1.78)	1.45 (0.66-3.18)
Parents birth place (2 parents foreign born)	0.65 (0.41-1.05)	0.93 (0.45-1.90)
Reidence in a Catholic canton	1.34* (1.02-1.77)	1.71* (1.11-2.63)
Attained study level ( below tertiary)	1.14 (0.90-1.45)	1.22 (0.82-1.81)
Sexual orientation (non-heterosexual)	0.57* (0.37-0.89)	0.79 (0.43-1.47)
Age at FI	0.91** (0.87-0.96)	0.94 (0.87-1.02)
Contraception used at first intercourse		
Contraceptive	1.69* (1.08-2.67)	2.06* (1.06-4.02)
non-use	1.96* (1.16-3.30)	8.09** (4.42-14.78)
Number of lifetime sexual partners		
4-7	1.17 (0.86-1.61)	0.69 (0.40-1.19)
8 and more	1.33 (0.94-1.86)	0.98 (0.57-1.70)
Anal intercourse (at least once)	1.34* (1.04-1.73)	1.04 (0.67-1.62)
History of STI (self or partner)	1.07 (0.66-1.75)	0.87 (0.36-2.08)
Type of relationship with actual partner.s		
1 casual partner	0.58 (0.33-1.01)	1.09 (0.49-2.44)
2 or more partners	0.63* (0.39-0.99)	1.83 (0.95-3.54)
single	0.60** (0.41-0.88)	0.71 (0.38-1.32)
frequency of vaginal intercourse ( more than once a week)	1.54** (1.18-2.01)	1.48 (0.95-2.28)

\*P< 0.05; \*\*P< 0.01