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Does the primary resource of sex education matter? A Swiss national study

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Abstract

Sex education (SE) remains a subject of debate, including controversies on resources. The purpose of this paper was to determine the main SE resource during adolescence and its associations with personal characteristics and sexual behaviors of youths. Data were obtained from a self-administrated Swiss national survey on sexuality among young adults (mean age 26.3). Participants (N=4978) were divided into 6 groups according to their main SE resource during their adolescence: Friends (1939; 38.9%), Parents (1361; 27.3%), School (n=949; 19.1%), The Internet (399; 8.0%), Nobody (172; 3.5%) and Other (157; 3.2%). Groups were compared on sociodemographic, first sexual experiences, pregnancy, risky sexual behaviors and undesired sexual experiences data. Males and non-heterosexual participants were overrepresented in the Internet group while females reported more often their parents. Participants in the School group reported the lowest rates of STI and Friends the highest. Compared to School group, those in the Friends, Internet, Nobody and Other groups were more likely to report undesired sexual experiences. Few differences appeared between parents and school. Even though some resources such as friends or the Internet presented negative outcomes when they were assessed individually, we cannot deny the important place that they occupy in the lives of some youths.

Introduction

Sexuality and sexual health are recognized as being an important part of the physical, emotional, mental and social well-being and development of youths (World Health Organization, 2006). In the same line, sexual education is also regularly mentioned and recognized in international formal texts (Committee on the rights of the child, 2003; WHO Regional Office for Europe & Federal Centre for Health Education (BZgA), 2010). Despite these considerations and this recognition, sexuality education (SE) remains a subject of debate, often political and emotional (Loeber et al., 2010; Macdowall et al., 2015; Sabia, 2006; Strasburger & Brown, 2014; Tanton et al., 2015; Wellings et al., 1995). Indeed, oppositions and controversies regularly affect content (e.g. abstinence-only versus safety), age (e.g. to start SE in primary school) or sexuality educators (e.g. school versus parents).

Regarding sexuality educators, one argument against school-based SE is that sexuality is a private subject and should therefore be managed by parents only, so they can transmit their values (Macdowall et al., 2015; Tanton et al., 2015). Another argument is that discussions in class might encourage youths to have earlier sexual experiences (Tanton et al., 2015; Wellings et al., 1995). However, previous studies on the effectiveness of school-based SE demonstrated that this kind of interventions significantly reduced risky sexual behaviors, increased awareness and knowledge, and did not advance the age at sexual initiation (Downing, Jones, Cook, & Bellis; Goldman, 2008; Kirby, Laris, & Rolleri, 2005; Kirby, Obasi, & Laris, 2006; Wellings et al., 2006; Wellings et al., 1995). School is also a place where a large number of pupils can be reached at the same time. It thus makes possible to introduce a certain frequency and follow-up in the delivery of messages and information. In addition, some parents may experience difficulties communicating on sex topics in terms of skills, discomfort, gendered messages and involvement (Goldman, 2008; Lindberg, Maddow-Zimet, & Boonstra, 2016; Macdowall et al., 2015; Macdowall et al., 2006; Martino, Elliott,

Corona, Kanouse, & Schuster, 2008). Therefore, close partnership and mutual support between home and school is the best strategy to cover diverse but complimentary aspects of sexuality and relationships (Macdowall et al., 2015; Shtarkshall, Santelli, & Hirsch, 2007; Walker, 2001). In this line, the 2000 British National Survey of Sexual Attitudes and Lifestyles (NATSAL) (Macdowall et al., 2006) found that participants who reported school or parents as their main resource for SE were less likely to feel a lack of knowledge before their first sexual experience compared to other resources such as peers, sexual partner or media.

In Switzerland, the first school-based SE was introduced in 1965 in the Canton of Geneva. Nowadays some differences still exist between the three linguistic regions of the country. In the French speaking part of Switzerland, SE external specialists provide continuous SE in classes, about every two years during mandatory school. In the Italian-part, the task is divided between teachers, the child protection and prevention foundation and family planning centers. In the German part, teachers are responsible for SE and some specialists are also part of it in some areas, mostly urban. The content then depends on the school and the teachers, ranging from a complete discussion to the bare minimum focusing on biological aspects only. The main difference between the regions is that the French part has more control over the program and the frequency by using a systematic approach. Despite these differences between cantons, the overall Swiss approach to SE follows the European standards with a holistic SE that does not focus on risks only, but also promotes sexual health and human rights (Ketting, Friele, & Michielsen, 2016; Swiss Federal Council, 2018; WHO Regional Office for Europe & Federal Centre for Health Education (BZgA), 2010). However, the topic of SE in Switzerland also continues to be a subject of debate on a regular basis. For example, in 2015, a popular initiative named “Protection against Sexualisation in Kindergarten and Primary School” attacked school-based sex education and aimed to prohibit it for children

under the age of 9, to offer it on a voluntary basis between the ages of 9 to 12 and to limit the mandatory one to youths aged 13 or more with biological discussions only. The Federal Council (Swiss Federal Council, 2014) recommended to refuse this popular initiative and reminded that even though parents remained primarily responsible for SE, school was present to support them with age-appropriate classes.

The purpose of this paper was to determine the main SE resource during adolescence and its associations with personal characteristics and sexual behaviors of youths. Based on the recommendations of partnership and collaboration between home and school, our hypothesis was that information about sexuality from both school and parents would lead to fewer risky sexual behaviors and better sexual health. To date, studies have mainly focused on parents and/or school (Allen, 2005; Fonner, Armstrong, Kennedy, O'Reilly, & Sweat, 2014; Kirby et al., 2005; Kirby et al., 2006; Martino et al., 2008) as SE resources and even when other resources, such as the Internet (Simon & Daneback, 2013), were assessed, they were not compared with others. The present study adds to the current knowledge by offering a more in-depth overview of the different SE resources analyzed in terms of sexual behaviors while taking into account variables such as puberty timing and a range of different undesired sexual experiences. In comparison, the NATSAL study also assessed different kinds of SE resources but these resources have either been grouped together (school, parents and others) (Macdowall et al., 2015) or associated with information needs rather than sexual behaviors (Tanton et al., 2015).

Methods

Data were obtained from a self-administered Swiss national survey on sexual behaviors among young adults. The initial sample was provided by the Swiss Federal Office of Statistics and was representative of the 24-26 year old population living in Switzerland in terms of gender, language (French, Italian or German) and canton of residence. An invitation

letter, that included the website and personal code to access the online questionnaire, was sent to all potential participants. The final sample included 7142 participants (response rate 15.1%, mean age 26.3 when completing the survey). To correct a slightly over-representation of females from the French-speaking part of Switzerland, analyses were weighted by gender and canton of residence. Ethic clearance in agreement with the 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 (Barrense-Dias Y. et al., 2018).

Participants

Out of the 7142 participants, 4978 (51% males) answered the single choice question *"During your youth and adolescence, who mainly informed you about sexuality?"* with nine possible answers: Mother, Father, School, Friends, Other family member (such as aunt, uncle, siblings, etc.), The Internet, Nobody, I do not know and Other with a free-text option. We decided to remove the 197 participants who answered *I do not know* as no hypothesis could be formulated. Therefore, 4978 participants were divided into 6 groups depending on the main source of sexuality information: Friends (n=1939), Parents (n=1361) School (n=949), The Internet (n=399), Nobody (n=172) and Other (including Other family members; n=157).

As we had a very few responses for fathers (3.7% of the entire sample) and based on some free-text answers that referred to both parents, we decided to lump them into a single category. Free-text answers (e.g. parents) were coded into the previous categories when pertinent.

Variables

Sociodemographic and personal data

Socio-demographic variables included gender, place of birth (Switzerland, other), place of residence (urban, rural), linguistic region (French, German or Italian), attained education level (tertiary, below), and perceived family socioeconomic status (SES). To assess the

family SES, we were inspired by the European School Project on Alcohol and other Drugs (Hibell et al., 2009) measure asking how they perceived their family financial situation at the age of 15 compared to other families in Switzerland and we dichotomized the 7 possible answers into below average and average or better. We also included two personal characteristics: sexual orientation identity and perception of puberty onset. For the sexual orientation identity, we used the question *"How would you describe yourself?"* with the following possible answers: Heterosexual, Lesbian / Gay, Bisexual, I do not know / I am not sure, I do not want to answer and Other. We created a dichotomized variable with clearly heterosexual on one side and non-heterosexual or not known on the other side including lesbian / gay, bisexual and I do not know / I am not sure. For the perceived self-reported onset of puberty (Berg-Kelly & Erdes, 1997), participants were asked *"If you think about the age at which you started your puberty, compared to other same-age youths, would you say that you were…"* with five possible answers ranging from "very much in advance" to "very much later" trichotomized into advanced, on time and delayed.

First sexual experiences

As some opponents argue that SE might advance the age at sexual initiation, especially with a school-based intervention (Tanton et al., 2015; Wellings et al., 1995), participants were asked to report their age at various first sexual experiences (oral, vaginal sex and anal sex). To avoid misunderstandings and heteronormativity, oral sex was defined as a mouth-sex contact (given or received) and vaginal / anal sex as the introduction of a penis or an object in the vagina / anus. We were also interested in other variables linked to their first sexual experiences because of previous studies that were interested in subsequent regret (Moreau, Költő, Young, Maillochon, & Godeau, 2019; Osorio et al., 2012; Wight et al., 2000). For example, association was found between subsequent regret and early age or no protection during their first intercourse. The recommendations addressed SE to reduce negative feelings

about their first sexual experiences. Thus, we used a question from the Swiss multicenter adolescent survey on health 2002 (F. Narring et al., 2004) on contraception and / or protection during their first intercourse. The proposed answers were gathered into three categories: none (also including withdrawal and temperature), contraception without condom use and condom use (combined or alone). We also asked additional questions on the first vaginal intercourse. First, we asked participants to report their reaction to their first vaginal experience in terms of later regrets and possible answers were: "I should not have done it", "I should have waited longer", "I should not have waited so long" and "It was the right moment". Second, we collected their perception of their first vaginal intercourse to determine if it was pleasant with three possible answers: pleasant, neutral and unpleasant.

Pregnancy data

As one of the arguments for SE is to decrease unintended teen pregnancy and abortion (Haberland & Rogow, 2015; Macdowall et al., 2006), we assessed the rate of overall and teenage pregnancies in each group and how the first pregnancy ended (continued, miscarriage or abortion) for females and males' partner. Groups were also compared on the mean age at first pregnancy.

Risky sexual behaviors

We assessed two kinds of risky sexual behaviors: history of sexually transmitted infection (STI) and the number of lifetime sexual partners (none, one, two or three, four or more). For those who reported having had at least one sexual partner in their life, the number of lifetime casual (defined as "one night stand") sexual partners was also assessed. The categories for sexual partners were based on previous studies (Baumann, Belanger, Akre, & Suris, 2011; Eaton et al., 2010) and on the distribution of the responses.

Undesired sexual experiences

As Switzerland adopted a rights-based SE approach including consent issues (Gordon, 2011), we assessed three types of undesired sexual experiences: sexual intercourse without really wanting (never, once, several times), unwanted sexual experiences (USE) (never, once, several times) and sexual assault/abuse (yes/no).

Data analyses

We first assessed the distribution of each SE resource, overall and by gender. Second, groups were compared on the previously described variables. For these bivariate analyses, we used chi-square tests for categorical variables and ANOVA for continuous ones. Statistically significant variables at the bivariate level were then entered into a multinomial regression analysis using the School group as the reference category. For the multivariate level, we created several models. First, groups were compared on sociodemographic and personal data (1). Then, we included data on the different studied topics (first sexual experiences (2), risky sexual behaviors (3) and undesired sexual experiences (4)) in three independent models controlling for sociodemographic and personal characteristics that were significant at the bivariate level. Results are given as relative risk ratios (RRR). The sample size being relatively large, we fixed the significance level of all statistical tests at 0.01 to avoid Type I errors. However, for the discussion and interpretation of the results, we also considered the trend with the level of 0.05. To determine the strength of an association between two variables, we also calculated the effect sizes by using Cramer's V for categorical variables and eta-squared for continuous ones. All the calculations were performed using STATA 14.0 (StataCorp, College Station, TX, USA).

Results

Sex education resources distribution

Overall, the first main SE resource was Friends (38.9%), followed by Parents (27.3%), School (19.1%), the Internet (8.0%), Nobody (3.5%) and Other (3.2%). Gender differences in

the ranking were found for the Nobody and Other groups only. Indeed, Nobody had the fifth place for males while it was ranked last for females.

Bivariate analyses

Sociodemographic and personal characteristics

At the bivariate level, males were overrepresented in the Internet group while females reported more often Parents as their main SE resource (Table 1). For School, males slightly outnumbered females. Participants who were born in Switzerland were more likely to report Parents as their main resource and reported less no sexual educator. We also found a significant difference in terms of linguistic region with Parents being the most reported resources in the German part while School was the most reported one in the French part and Nobody in the Italian part. Participants who perceived their family SES as below average were more likely to report Nobody. No differences were found in terms of residence and education level. Those who identified themselves as non-heterosexual reported more often the Internet as their main resource. Finally, those who perceived their puberty as out of the range (advanced or delayed) were also more likely to report the Internet as their main resource.

First sexual experiences

No differences were found in terms of age at first anal sex (Table 2). However, differences were found for first oral and vaginal sex: participants in the School group were older at their first oral and vaginal experience compared to other groups, while those in the Friends group were the ones starting at a younger age. Participants in the Internet and Nobody groups were more likely to report no contraception or protection at first intercourse while participants in the Parents and Other groups were the most likely to report condoms. No differences were found in terms of pleasantness and reaction for first vaginal sex.

Pregnancy data

Only 37 participants reported a pregnancy before age 18 and the age for these teen pregnancies, whether interrupted or continued, was comprised between 14.9 and 16.5 years. Overall, the age at first pregnancy (n=432), whether interrupted or continued, ranged between 20.7 and 23.4 years (22.8 and 23.8 without teen pregnancies). While pregnancies were mainly uninterrupted (54.0%) overall, abortions (34.2%) were more common among teen pregnancies (76.5% versus 30.1%). However, no differences were found between the different SE groups at the bivariate level (data not shown).

Risky sexual behaviors

Groups were different on STI history (Table 3), with participants in the School group reporting the lowest rates and Friends the highest. There was a difference between groups regarding the number of lifetime sexual partners, both overall and casual. For the highest category (4 or more), the School group was the less represented in both cases (48.1% for overall, 27.9% for casual).

Undesired sexual experiences

No differences were found for USE and sexual abuse but groups differed on having ever accepted sexual intercourse without really wanting, with those in the School group being less likely to report such an experience (Table 4). For the category "several times", the Other group was the one reporting more frequently.

Multivariate analyses

Sociodemographic and personal data

At the multivariate level (Table 5), compared to participants in the School group, those in the Parents group were less likely to be males (RRR 0.54) and to live in the French part of Switzerland (0.52), and more likely to be Swiss-born (1.84). They were also more likely to perceive their puberty onset as advanced compared to their peers (1.30).

Those in the Friends group were less likely to assess their SES as below average (0.72) and live in the French-speaking part of Switzerland (0.68). These participants were also more likely to be Swiss-born (1.37) and to perceive their puberty as out of the range (1.30 for advanced and 1.23 for delayed).

Participants who relied mainly on the Internet were more likely to be males (1.53), to identify themselves as non-heterosexual (2.78) and to perceive their puberty onset as out of the norms (2.05 for advanced and 1.82 for delayed).

Participants in the Nobody group were more likely to assess their family SES as below average (1.53; $p < .05$). Those in Other group were less likely to be males (0.56).

First sexual experiences

Controlling for significant sociodemographic and personal data, variables on first sexual experiences were added to the second model for a multinomial regression analysis (Table 6).

No differences were found between School and Nobody or Other groups. Participants in the Parents group were more likely to be younger at their first oral sex (0.94) and to have used condoms (1.72) or contraception (1.77) during their first intercourse. Those in the Friends group were more likely to be younger at their first oral (0.91) and vaginal (0.94) sex. Those who used Internet as their main SE resource were more likely to be younger at their first oral sex (0.92).

Risky sexual behaviors

Compared to those in the School group, those in the Parents (1.58 for 4 or more) and Friends (1.51 for 2-3; 2.30 for 4 or more) groups were more likely to report a higher number of lifetime sexual partners (Table 7). Those in the Other group were more likely to report a higher number of lifetime casual sexual partners (1.92 for 2-3; 2.86 for four or more). Participants in the Friends (1.46) and the Internet (1.58) groups were more likely to report a STI history.

Undesired sexual experiences

Compared to the School group, those in the Friends (once: 1.46, several times: 1.67), the Internet (once: 1.71, several times: 1.74), Nobody (several times: 1.65) and Other (several times: 1.76) groups were more likely to report sexual experiences without really wanting (Table 8). No differences were found between School and Parents.

Discussion

In terms of distribution, Friends and Parents preceded School as the main SE resource. However, for males, when Parents were divided into father and mother, School took the second place and the mother the third one. This finding is important in terms of collaboration and partnership. Indeed, informal informants, such as family and peers, are very important in adolescents' lives (Powell, 2008) and should be taken as additional opportunities for SE.

We found a difference between linguistic regions. This result can be explained by differences in the organization, professionalization and frequency of school-based sexuality education in Switzerland (Alliance pour une éducation sexuelle). Our findings also highlighted gender differences in terms of access or use of two resources: Parents and the Internet. Indeed, males were more likely to use the Internet as their main resource while Parents and Other groups were more often reported by females. Certain events in a woman's life, such as menarche, may make it easier to start a discussion on sexuality between mothers and daughters. Same gender might explain the place of mothers in the SE of their daughters. However, this result can be interpreted in the light of the risk of a gendered SE that was previously addressed in the literature (Diiorio, Kelley, & Hockenberry-Eaton, 1999; Macdowall et al., 2015; Macdowall et al., 2006). First, a gendered SE could affect the topics by focusing on "girls issues" (p.9) (Macdowall et al., 2015) only, such as periods, pregnancies or contraceptive pills. Second, a gendered SE could also have an impact on the

targets with discussion being easier to conduct with girls than boys, with the risk that the latter would therefore not receive as much SE from parents.

On the other hand, this result could also explain the place of the Internet as a SE resource for males. In a previous study on how young males try to find help when they face sexual dysfunctions (Akre, Michaud, & Suris, 2010), participants considered that the Internet was a very convenient mean. The possibility of remaining anonymous, avoiding face-to face discussion and having unlimited access to information were part of its benefits. Furthermore, using the Internet as a source of sexual information could also imply accessing online pornography (Tanton et al., 2015) and viewing pornography was more reported among young men. In the national study used for this paper (Barrense-Dias Y. et al., 2018), 96% of men reported ever surfing on the Internet to see pornographic content against 63% of women.

Foreign-born participants were less likely to report Parents as their main SE resource, demonstrating the importance of an in-school SE based on equality and accessibility for all. This finding could be explained by different cultural contexts where sexuality could be considered as a taboo subject. However, our data seem to indicate that school can fill the gap for these youths whose informal relay is not available. Moreover, these foreign-born youths did not seem to turn to the Internet, as it was the case in a Swedish study (Daneback, Månsson, Ross, & Markham, 2012).

Participants who identified themselves as non-heterosexual were overrepresented in the Internet group, as their needs might not be met by the other resources. Similarly to a SE that might focus on girls issues, a too heteronormative SE could make some youths turn to other sources of information. In an American study on experiences with SE in school (Pingel, Thomas, Harmell, & Bauermeister, 2013), gay, bisexual and questioning young men perceived that discussions and presentations were limited to heterosexual experiences. Given the perceived advantages of the Internet mentioned above, this tool could facilitate the

expression of questioning and curiosity without having to manage the reactions coming from peers or direct surroundings (Daneback et al., 2012; Simon & Daneback, 2013). In a recent article, adolescent males who are interested in sex with males also reported preferences for an online SE program (Nelson, Pantalone, & Carey, 2018).

Finally, in terms of personal characteristics, school-based SE seems to be unsuited for young people who perceive their puberty onset as out of the norms. Indeed, those who assessed it as advanced compared to their peers were more likely to report Parents, Friends or The Internet as their main SE resource, and those with a delayed puberty were more likely to rely on their Friends or the Internet. Based on a p-value of 1%, only the Internet remained significant for these participants who perceived their puberty as out of the norms, demonstrating its importance. In addition to individual questions, in-school SE must cover an established curriculum and certainly cannot always adapt to this kind of complexity. Some topics discussed in a school-based SE may come too late or too early, or not include the desired information for those youths, who turn to other sources of information when they need them. It is therefore important that other resources are also presented during these courses to help those who do not find themselves in the presentations to address other people/services. This result on pubertal timing can also support a recommendation to start SE early enough to be sure to meet the demands and needs as they arise. The argument that SE in school could encourage sexual experiences is not supported by our results.

Mixed results were found for the Friends group. Compared to the School group, participants in the Friends group were more likely to report a history of STI ($p<.05$), a higher number of lifetime sexual partners and of unwanted sexual experiences. But no differences were found for protection at first sexual intercourse and number of lifetime casual sexual partners. In addition, it is worth noting that friends have an important place in young people's life, as they were the most reported sexuality information resource in our study. Our findings

argue for peer prevention. Indeed, by using a positive vision of group pressure, this approach would allow multipliers of awareness and education messages.

One of our main results is the place of the Internet for youths who are out of social norms and for males. Compared to School, reporting the Internet as the main SE resource was associated with sexual experiences without really wanting (once and several times) and STI history ($p<.05$). However, no differences were found for protection at first sexual intercourse and number of lifetime sexual partners. These mixed findings must be taken into account, especially because the Internet is now part of the daily lives of youths. Our study is based on young adults with a mean age of 26 years and we asked them to remember the SE they received about 10 years ago. Since then, there have been many changes and developments in terms of use and access to the Internet that could also impact sexuality knowledge (Tanton et al., 2015). For example, a Swiss study (Waller, Willemse, Genner, Suter, & Süss, 2016) on media use among youths aged 12-19 years old showed that 92% reported a daily use of the Internet services in 2016. This example demonstrate that Internet is a tool that must also be addressed in the planning out of SE, particularly in terms of literacy and quality of the information.

Few differences appeared between parents and school, showing that there is no hierarchy between these two actors, but that close collaboration and strong partnership are necessary. Compared to School, participants in the Parents groups were more likely to have used condoms or contraception during their first intercourse ($p<.05$), demonstrating the importance of parents in the continuity of protection messages. Parents themselves even ask to be helped in their role of sexuality educators (Macdowall et al., 2015; Macdowall et al., 2006; Walker, 2001; Walker & Milton, 2006). In a qualitative study (Walker, 2001), parents also reported the necessity to improve communication on SE between school and home, especially in terms of content and available resources. The partnership between parents and school can be

considered in a reciprocal way with two different but complementary missions: SE and sexual socialization (Shtarkshall et al., 2007).

Reporting the Other group as the main SE resource was associated with a higher number of casual sexual partners and undesired sexual experiences. In addition to the inclusion of the category of other family member such as siblings, we also included the other category that offered the possibility of free-text answers. We report the most often mentioned answers to get an idea of the range of possibilities in terms of sex education: stepparents, holiday camp, sports team, or books and magazines. With the exception of books, we can observe that a wider circle of friends or peers and family can also be a resource for SE and must be taken into account.

The concept of holistic SE aims to address several areas of sexuality in terms of topics: physical, psychological, social, emotional, etc. (Ketting et al., 2016). Given our results, we recommend a multidimensional approach in terms of SE and information resources. Even though some resources such as Friends, the Internet or Other presented some problems in terms of sexual health and well-being when they were assessed individually, we cannot deny the important place that they occupy in the lives of some youths.

Strengths and limitations

The first strength of this study is the sample size. Even if the response rate was low (15.1%) for the overall study, it is still a very large representative sample of this population. We also used a large variety of sexuality information resources and analyzed them separately to obtain an in-depth overview and to examine resources different from the most commonly studied.

However, some limitations need to be put forward. First, the response rate was lower than expected. Three factors could explained this point: sexuality remains a sensitive theme and the survey was opened between June and September, summer holidays in Switzerland and we

had postal instead of electronic mail to contact potential participants. For these reasons, we decided to start with a very large sample so that the final sample would be large enough for statistical purposes. Second, we asked participants with a mean age of 26.3 years to remember their SE during their adolescence. In addition to a possible recall bias, we are aware that SE has probably evolved since then. It would therefore be interesting to ask this question to youths who are just out of mandatory school or under 18, although asking the question at the age of 26 gives them an important temporal perspective. Third, this is a cross-sectional study and no causation can be inferred. Fourth, since the question used to create our groups was single choice, we do not have information on secondary or additional resources and how often these were used in relation to the first priority. Fifth, we did not collect data on the quality and quantity of sexual information received during their adolescence. Sixth, in the same line, we did not differentiate pornography from online information. Finally, the Other group as a SE resource was very heterogeneous and we did not have information on the Nobody group. Indeed, when we analyzed free-text responses for the Other category, we wondered if some people had answered Nobody because someone had given them a book without any further intervention. Therefore, there was a SE resource with a book but no one to explain or be present for other questionings.

Conclusions

Overall, friends and parents preceded school as the main SE resource. Males and non-heterosexual participants were overrepresented in the Internet group while females reported more often their parents. Few differences appeared between parents and school in terms of first sexual experiences, risky sexual behaviors and undesired sexual experiences. Even though some resources such as friends or the Internet presented negative outcomes, the important place they may have for some youths can be denied.

Therefore, in addition to a holistic SE in terms of topics, it is necessary to consider a multi-resource approach to ensure continuity and consistency of prevention and health promoting messages. Indeed, while a strong partnership between school and parents is the best strategy to cover all aspects of sexuality, other additional resources should also be considered and analyzed in a positive way.

It is also important to include youths in the conception of the curriculum and resources for SE to ensure inclusion and interest, especially for sexual and ethnic minorities, but also update the content based on the concerns of youths.

Particular attention should also be paid to heteronormative, even unintended, discourses. Thereby, youths can solicit help and ask questions without embarrassment or fear thanks to non-judgmental messages.

Finally, if using the Internet as the primary source of information seems more related to problematic sexual behaviors, it is essential to consider it as one of the resources available to youths today. It is therefore important to educate them to use it to ensure that the information is correctly received and sorted. To ensure that all youths find answers to their questions and reliable information, SE classes should also systematically present other resources, including online ones, that are available for further search.

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Table 1 Bivariate analysis comparing the six groups of main SE resource: sociodemographic and personal data

	School (n=949)	**Parents (n=1361)**	**Friends (n=1939)**	**Internet (n=399)**	**Nobody (n=172)**	**Other (n=157)**	***p-value***	Effect size
Gender (male)	55.3%	40.6%	52.8%	65.1%	57.7%	42.0%	<.001	.15
Swiss-born (yes)	85.1%	91.4%	88.9%	87.9%	78.9%	89.2%	<.001	.09
Residence (urban)	50.6%	52.2%	54.1%	54.0%	48.9%	55.6%	0.4373	.03
Linguistic region							<.001	.08
German	61.7%	75.1%	70.2%	66.7%	60.7%	69.4%		
French	35.1%	21.2%	26.6%	28.4%	33.6%	26.9%		
Italian	3.2%	3.7%	3.3%	4.9%	5.7%	3.7%		
Family SES (below average)	17.4%	15.3%	13.1%	17.8%	24.9%	19.8%	<.001	.07
Education (tertiary)	51.1%	54.2%	54.5%	54.3%	43.1%	54.0%	0.0778	.05
Sexual identity (non-hetero)	6.8%	6.3%	6.9%	16.8%	10.7%	5.7%	<.001	.11
Perceived puberty onset							<.001	.06
Advanced	23.1%	28.7%	26.7%	32.1%	27.3%	26.2%		
Average	50.3%	43.5%	43.5%	34.7%	45.2%	46.3%		
Delayed	26.5%	27.7%	29.7%	33.2%	27.5%	27.4%		

Chi-square tests for p-value

Cramer's V tests for effect size

Table 2 Bivariate analysis comparing the six groups of main SE resource: first sexual experiences data

	School (n=949)	**Parents (n=1361)**	**Friends (n=1939)**	**Internet (n=399)**	**Nobody (n=172)**	**Other (n=157)**	***p-value***	Effect size
Age at first oral sex (mean±SE)	18.7±.13	18.0±.10	17.5±.08	18.2±.20	18.2±.20	17.9±.27	<.01	.02
Age at first vaginal sex (mean±SE)	18.2±.12	17.7±.09	17.3±.07	18.0±.18	17.7±.30	17.7±.27	<.01	.01
Age at first anal sex (mean±SE)	21.0±.20	20.7±.17	20.8±.13	20.4±.28	21.2±.59	22.0±.46	0.816	.006
Perception of first vaginal sex							0.2356	.04
Pleasant	47.3%	49.2%	47.4%	44.0%	54.8%	39.8%		
Neither pleasant nor unpleasant	33.1%	32.6%	35.3%	34.7%	32.0%	41.0%		
Unpleasant	19.6%	18.2%	17.4%	21.3%	13.2%	19.2%		
Contraception / protection at first intercourse							<.01	.06
None	7.8%	5.1%	5.9%	11.7%	11.8%	3.9%		
Condoms (combined or not)	83.9%	87.1%	86.1%	82.2%	81.0%	87.3%		
Contraception only	8.2%	7.8%	8.0%	6.1%	7.2%	8.8%		

(without condom)								
Reaction to first vaginal sex							<.05	.05
Should not have done it	6.9%	7.0%	6.5%	10.6%	10.9%	9.5%		
Should have waited longer	11.1%	8.5%	7.3%	9.5%	9.0%	8.1%		
Should not have waited so long	7.9%	6.2%	8.8%	11.1%	9.0%	8.0%		
It was the right moment	74.1%	78.3%	77.4%	68.8%	71.1%	74.4%		

Chi-square and ANOVA (continuous variable) tests for p-value

Cramer's V and eta-squared (continuous variable) tests for effect size

Table 3 Bivariate analysis comparing the six groups of main SE resource: risky sexual behaviors data

	School (n=949)	**Parents (n=1361)**	**Friends (n=1939)**	**Internet (n=399)**	**Nobody (n=172)**	**Other (n=157)**	***p-value***	Effect size
STI history	6.8%	8.2%	11.7%	11.3%	8.4%	11.6%	<.001	.07
Number of lifetime sexual partners							<.001	.12
None	9.7%	6.1%	1.8%	6.5%	13.6%	4.3%		
1	19.5%	16.9%	10.8%	14.3%	14.2%	15.3%		
2-3	22.8%	21.3%	18.9%	22.2%	20.3%	19.6%		

4 or more	48.1%	55.6%	68.5%	57.0%	51.9%	60.8%		
Number of lifetime casual sexual partners							<.001	.08
None	33.1%	31.2%	21.4%	28.7%	28.4%	22.3%		
1	16.8%	13.9%	13.2%	13.3%	12.1%	12.3%		
2-3	22.2%	24.0%	26.4%	25.8%	19.5%	23.1%		
4 or more	27.9%	30.9%	38.9%	32.2%	40.0%	42.3%		

Chi-square tests for p-value

Cramer's V tests for effect size

Table 4 Bivariate analysis comparing the six groups of main SE resource: undesired sexual experiences data

	School (n=949)	**Parents (n=1361)**	**Friends (n=1939)**	**Internet (n=399)**	**Nobody (n=172)**	**Other (n=157)**	***p-value***	Effect size
Unwanted sexual experiences							0.0892	.04
Never	85.5	84.1	83.5	83.5	80.0	75.1		
Once	9.3	10.5	11.6	9.9	13.6	16.4		
Several times	5.2	5.4	5.0	6.6	6.4	8.5		
Ever accepted sexual intercourse without really wanting							<.001	.07
Never	69.3	63.5	59.2	58.0	62.1	57.1		
Once	15.1	15.1	18.1	21.2	14.1	14.8		

Several times	15.6	21.4	22.7	20.8	23.8	28.1		
Sexual abuse (yes)	8.3	9.6	9.0	7.9	12.2	12.3	0.2823	.03

Chi-square tests for p-value

Cramer's V tests for effect size

Table 5 Multinomial regression analysis for main SE resource with School as the reference category: sociodemographic and personal data (Model 1)

	Parents RRR (95% CI)	**Friends RRR (95% CI)**	**Internet RRR (95% CI)**	**Nobody RRR (95% CI)**	**Other RRR (95% CI)**
Gender (male)	**0.54*** **(0.45-0.65)**	0.90 (0.76-1.06)	**1.53*** **(1.18-1.97)**	1.12 (0.79-1.59)	**0.56*** **(0.38-0.81)**
Swiss-born (yes)	**1.84*** **(1.39-2.43)**	**1.37**** **(1.07-1.75)**	1.34 (0.91-1.97)	0.74 (0.47-1.17)	1.57 (0.90-2.73)
Family SES (below average)	0.85 (0.67-1.09)	**0.72*** **(0.57-0.90)**	1.00 (0.72-1.39)	**1.53**** **(1.01-2.32)**	1.14 (0.73-1.79)
Linguistic region/canton (French)	**0.52*** **(0.43-0.63)**	**0.68*** **(0.57-0.82)**	0.79 (0.60-1.04)	1.02 (0.70-1.49)	0.72 (0.49-1.07)
Linguistic region/canton (Italian)	1.01 (0.69-1.43)	0.93 (0.57-1.50)	1.51 (0.78-2.93)	2.09 (0.93-4.71)	1.11 (0.41-3.05)
Sexual identity (non-heterosexual)	1.00 (0.69-1.43)	1.09 (0.78-1.52)	**2.78*** **(1.86-4.15)**	1.44 (0.79-2.61)	0.87 (0.44-1.73)
Puberty (advanced)	**1.30**** **(1.04-1.61)**	**1.30**** **(1.06-1.60)**	**2.05*** **(1.50-2.80)**	1.32 (0.86-2.03)	1.14 (0.73-1.79)
Puberty (delayed)	1.14	**1.23****	**1.82***	1.21	1.14

	(0.92-1.41)	**(1.00-1.50)**	**(1.34-2.47)**	(0.79-1.86)	(0.75-1.74)

*Significant difference with the reference category (School) * (p<.01) ** (p<.05)*

Table 6 Multinomial regression analysis for main SE resource with School as the reference category: first sexual experiences, controlling for significant sociodemographic and personal data (Model 2)

	Parents RRR (95% CI)	**Friends RRR (95% CI)**	**Internet RRR (95% CI)**	**Nobody RRR (95% CI)**	**Other RRR (95% CI)**
Age at first oral sex	**0.94** (0.89-0.99)**	**0.91* (0.87-0.96)**	**0.92** (0.86-0.99)**	0.98 (0.87-1.11)	0.96 (0.85-1.08)
Age at first vaginal sex	0.98 (0.92-1.04)	**0.95** (0.90-1.00)**	1.04 (0.97-1.12)	0.98 (0.87-1.11)	0.94 (0.82-1.07)
Contraception / protection at first sexual intercourse (Condoms (combined or not))	**1.72** (1.10-2.67)**	1.42 (1.07-2.52)	0.73 (0.44-1.20)	0.78 (0.40-1.54)	3.16 (0.94-10.6)
Contraception / protection at first sexual intercourse (Contraception only (without condom))	**1.77** (1.02-3.07)**	1.65 (1.00-2.73)	0.66 (0.32-1.36)	0.85 (0.31-2.36)	4.01 (1.02-15.7)

*Significant difference with the reference category (School) *(p<.01) ** (p<.05)*

Table 7 Multinomial regression analysis for main SE resource with School as the reference category: risky sexual behaviors, controlling for significant sociodemographic and personal data (Model 3)

	Parents	**Friends**	**Internet**	**Nobody**	**Other**

	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
STI history (at least once)	1.09 (0.77-1.53)	**1.46** (1.07-1.99)**	**1.58** (1.02-2.43)**	1.09 (0.56-2.09)	1.41 (0.78-2.55)
Number of lifetime sexual partners (2-3)	1.16 (0.86-1.56)	**1.51** (1.12-2.03)*	1.42 (0.91-2.22)	1.35 (0.73-2.50)	0.94 (0.52-1.73)
Number of lifetime sexual partners (4 or more)	**1.58** (1.10-2.27)**	**2.30** (1.62-3.26)*	1.54 (0.90-2.62)	1.05 (0.46-2.37)	0.77 (0.40-1.50)
Number of lifetime casual sexual partners (one)	0.81 (0.59-1.11)	0.95 (0.71-1.29)	0.78 (0.49-1.22)	0.69 (0.35-1.37)	1.26 (0.68-2.36)
Number of lifetime casual sexual partners (2-3)	0.92 (0.65-1.28)	1.14 (0.83-1.57)	0.97 (0.60-1.57)	0.98 (0.46-2.10)	**1.92** (1.01-3.63)**
Number of lifetime casual sexual partners (4 or more)	0.89 (0.62-1.28)	1.22 (0.87-1.73)	0.79 (0.47-1.32)	1.62 (0.73-3.61)	**2.86** (1.49-5.48)*

*Significant difference with the reference category (School) * (p<.01) ** (p<.05)*

Table 8 Multinomial regression analysis for main SE resource with School as the reference category: undesired sexual experiences, controlling for significant sociodemographic and personal data (Model 4)

	Parents RRR (95% CI)	Friends RRR (95% CI)	Internet RRR (95% CI)	Nobody RRR (95% CI)	Other RRR (95% CI)
Sexual experiences w/o really wanting (once)	0.94 (0.73-1.21)	**1.46** (1.16-1.83)*	**1.71** (1.23-2.37)*	1.02 (0.61-1.71)	1.11 (0.67-1.85)

Sexual experiences w/o really wanting (several times)	1.10 (0.87-1.41)	**1.67* (1.33-2.09)**	**1.74* (1.25-2.43)**	**1.65** (1.07-2.54)**	**1.76* (1.17-2.66)**

*Significant difference with the reference category (School) * (p<.01) ** (p<.05)*