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► To cite this version:

Marie-Josèphe Saurel-Cubizolles, Brigitte Lhomond, Mireille Coeuret-Pellicer. Same-sex sexual behaviour and psychological health: CONSTANCES, a population survey in France. *SSM - Population Health*, 2023, 22, pp.101396. 10.1016/j.ssmph.2023.101396 . hal-04093585

HAL Id: hal-04093585

<https://hal.science/hal-04093585v1>

Submitted on 29 Jun 2023

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Same-sex sexual behaviour and psychological health: CONSTANCES, a population survey in France

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ARTICLE INFO

Keywords:

Same-sex partner
Psychological health
Sex
Social inequalities

ABSTRACT

Rationale: Having same-sex partners is linked to poor psychological health and increased risk of suicide attempt. This link seems to be stronger for men than women. However, in France, there have been few studies of population samples, and the size of these studies does not always allow an in-depth analysis of these associations. **Methods and results:** This study explored these associations by analysing data from a large epidemiological survey conducted in France from 2012 to 2019 that included 84,791 women and 75,530 men. The frequencies and risk ratios of depression, suicide attempts, alcohol dependence and regular cannabis use were calculated regarding two groups: those with only the other sex partners and those with any same sex partners. Risk of alcohol addiction and cannabis use was greatly increased for women who had homosexual relations, even after adjustment for social, demographic and sexual life factors, which was not the case for men. However, risk of depression and suicide attempts was increased for men who had homosexual relations; this was also true for women but to a lesser extent. The estimates remained unchanged after stratifying the population by three distinct social groups defined by education level.

Conclusions: The analysis of these differences was possible because of the large sample size of the CONSTANCES survey and its recruitment in the general population. This study helps increase knowledge of the health of sexual minorities. It can help clinicians pay more attention to the potential distress of their patients and can continue to inform policymakers of the effects of discrimination and stigmatisation linked to homosexual behaviour.

1. Introduction

The old stream of research, focused on homosexuality as a problem, has undergone tremendous transformation. Until the 1950s, the presupposition of most of these works was that homosexuality as such is a mental pathology, following some theories of psychiatry dating from the middle of the 19th century. Up to 1974, the American Psychiatric Association and up to 1993, the World Health Organization considered homosexuality as a mental illness.

The pioneering work of Evelyne Hooker (Hooker, 1993) on homosexual men in the 1950s and Marcel Saghir (Saghir et al., 1970) on homosexual women allowed for questioning what was then widely accepted, by showing that homosexuals did not themselves present differences from heterosexuals in psychological health. In addition, surveys on sexual behaviour by Alfred Kinsey (Kinsey et al., 1948, 1953)

during the same period changed the perception of both scientists and the general public of the frequency of homosexual behaviour and highlighted the continuum between different expressions of sexuality (Gagnon, 1990; Michaels & Lhomond, 2006). In scientific works as well as in activist movements, homosexuality is often considered the homosexuality of men. Compulsory heterosexuality that weighs more heavily on women than men and social stigma that is more often placed on men than women are examples of the differential treatment of gay men and lesbians.

The research theme of the mental health of homosexuals as a public health issue remains underdeveloped, particularly in France. However, demands have emerged for better knowledge and consideration of all health issues concerning gays and lesbians, as shown, for example, by the editorials of two special issues of the *American Journal of Public Health* on this theme in 2001 and 2008 (Auerbach, 2008; Meyer, 2001).

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<https://doi.org/10.1016/j.ssmph.2023.101396>

Received 19 December 2022; Received in revised form 5 March 2023; Accepted 3 April 2023

Available online 5 April 2023

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Literature reviews on gay and lesbian health have been published since the early 2000s (Saunders & Valente, 1987; Cochran, 2001; McAndrew et al., 2004; Julien & Chartrand, 2005; Herek, 2007; King et al., 2008; Lhomond & Saurel-Cubizolles, 2009; Plöderl & Tremblay, 2015). These reviews show a consistent picture of poor mental health for homosexual and especially bisexual persons. The studies are particularly consistent concerning the increased risk of suicide attempts.

Since 1981, France has experienced significant changes in laws relating to homosexuality (Mossuz-Lavau, 1991). Since June 1981, homosexuality no longer appears on the list of mental illnesses. In 1982, the legislation on the discriminatory age of consent was abolished: previously, it was 15 years for sex between persons of the other sex and 18 years for sex between persons of the same sex. According to the Quilliot law on the rights and duties of housing owners and tenants, the homosexual “lifestyle” ceased to be a cause for cancelling a residential lease (Law n°82-683 on August 4th 1982). In 1999, the civil union pact *Pacte Civil de Solidarité* (PACS) was adopted (Rault, 2019). However, this civil union does not establish any bond of filiation between each of the partners and the child of one of them and does not authorize joint adoption. Since 2004, the Penal Code has punished discrimination on the basis of sexual orientation and considers as an aggravating circumstance the fact that a crime or an offence is committed because of the sexual orientation of the victim. In 2013, marriage for same-sex couples was authorized in France. This law allows for joint adoption by same-sex married couples and the adoption of a step-child within a married couple. In 2014, 10,500 same-sex marriages and 6200 same-sex PACS were signed (INSEE, 2014).

These changes in legislation have been accompanied by strong resistance and protests from a section of society, on the far right of the political spectrum, against the PACS and even more visibly against “marriage for all”. In France there are no national statistics on the evolution of the hostile acts against homosexual persons. Since 1997 the association “SOS Homophobie” publishes an annual report on spontaneously declared homophobic acts and behaviours (SOS Homophobie, 2022). These documents are a useful advocacy tool to raise awareness but do not provide a scientific assessment of the evolution of discrimination against homosexuals in our country. If the public attitudes may evolve when the public policies change (Aksoy et al., 2020) discrimination does not disappear as shown on an international level (OCDE, 2019).

With regard to recent French data, the situation of women who have had homosexual behaviours was studied using data from the national survey on violence against women in France (ENVEFF), conducted in 2000 (Jaspard et al., 2003; Lhomond & Saurel-Cubizolles, 2006). For women as for men, the extent of risks in terms of psychoactive substance use and psychological illness differs depending on the dimension of sexual orientation (attraction, sex of partners, self-definition) considered (Lhomond et al., 2014).

With data from a large study carried out in France since 2012, we aimed to 1) estimate the proportion of persons having same-sex partners and analyse the associations between having had a same-sex partner and psychological disorders and 2) test the hypothesis of a social heterogeneity by comparing the magnitude of these associations by social groups defined by education level.

2. Methods

2.1. Survey and participants

The CONSTANCES cohort included volunteers aged 18–69 years at baseline in 22 selected health screening centres from the principal regions of France, from February 2012 to June 2019 (Zins et al., 2010). The participants were selected among adults who benefited from the French national health insurance fund according to a random sampling scheme stratified on age, sex, socio-professional category and region of France. The inclusion visit comprised administration of a set of

self-administered questionnaires asking about demographic and social characteristics and health-related behaviours, self-reported health and occupational exposures. Comprehensive health examinations were offered free of charge to participants.

The CONSTANCES cohort obtained the authorization of the national data protection authority (*Commission Nationale de l'Informatique et des Libertés*) (no. 910486) and was approved by the institutional review board of the National Institute for Health and Medical Research.

2.2. Indicators

2.2.1. Exposure is defined as having reported at least one same-sex partner during the lifetime

This variable was constructed from two survey questions: the first was sex of first sexual partner and the second was the number of partners during lifetime whatever their sex. We obtained a two-modality variable: “having had sexual relations only with partners of the other sex” versus “having had sexual relations with partners of either sex or only same-sex partners”.

2.2.2. Psychological health disorders using four outcome indicators

- Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). This scale was validated in French (Morin et al., 2011). It includes 20 items and the score range is 0–60. Participants with a score of >18 were classified as “depressive” in a two-class variable, yes/no (Airagnes et al., 2019).
- Suicidal attempts: at least once in lifetime as a two-class variable, yes/no;
- Alcohol dependence was assessed with the Alcohol Use Disorders Identification Test (Babor et al., 2001) a 10-item self-administered questionnaire built as a transcultural screening tool on recent alcohol use, alcohol dependence symptoms and alcohol-related problems. The score ranges from 0 to 40. Participants who scored 20 to 40 were classified as “dependent”.
- Regular cannabis use was defined as use 12 times or more in the last 12 months.

2.2.3. Living conditions as co-variables

- Four variables describing the sexual biography: age at first sexual relation; sex of the first sexual partner (man/woman); number of sex partners in the lifetime (1/2/3–5/6–10/>10/not answered); currently having or not sexual relations with a steady partner.
- Demographic and social characteristics: age, living in a couple relationship (cohabitant/non-cohabitant/not in a couple), having children (yes/no), nationality (French/other than French), population of place of residence (<10,000/10,000–200,000/> 200,000 inhabitants/Paris area/missing), education level (less than baccalaureate/baccalaureate/baccalaureate + 1–4 years/baccalaureate + 5 years or more), current employment status (employed/unemployed/retired/other, not working) and having financial difficulties (yes/no).

2.3. Statistical analysis

All analyses were performed separately for men and women. The strategy of analysis was as follows. First, we estimated the proportion of respondents who have had sex with same-sex partners and the extent to which sexual biography and sociodemographic indicators vary according to same- or other-sex sexual behaviour. Second, we analysed the association between “same-sex partner or not” and indicators of psychological health. We accounted for demographic, social and sexual characteristics that were likely confounding factors in these associations. Third, we tested for possible social heterogeneity by analysing the

magnitude of these association in different social groups, defined by using education level in a reduced three-class variable: baccalaureate or lower, baccalaureate +1–4 years, baccalaureate +5 or more years.

Data were analysed statistically by Pearson chi-squared test or Student *t*-test. We estimated risk ratios (RRs) and their 95% confidence intervals (CIs) for psychological health indicators according to having had a same-sex partner. These estimations were calculated with Poisson regression models with robust variance (Greenland, 2004). First, we present a model adjusted for age as a continuous variable, then we added children, education, size of place of residence and nationality as discrete variables in the adjustment; finally, we added age at first sex and more than 10 sexual partners during the lifetime.

We opted for a classical statistical analysis strategy in epidemiology: estimates of frequencies or prevalence and their comparison by the usual statistical tests. We preferred the estimation of adjusted RRs rather than odds ratios in order to directly obtain the risk multiplier. The first adjustment corrects for only the different age structure of the groups compared, which is important for a sample of individuals aged 18 to 69 as in this study. This adjustment is essential to compare the “true” level of risk because both the prevalence of mental health disorders and homosexual behaviour is related to age. The second adjustment on social factors allows for accounting for a possible confounding effect in the association between partners’ sex and mental health disorders. This is important in terms of education level or employment status because we know to what extent these mental health disorders are more frequent in less educated groups or unemployed people (Alvarez-Galvez & Rojas-Garcia, 2019). The third adjustment allows for considering some elements of sexual biography and the very large differences between the groups being compared, both for men and women.

We looked for statistical interactions: to determine possible differences between men and women, we included the factor “participant’s sex*partners’ sex” in the full multivariable models calculated in the total sample and in men and women. Then, to test for a possible difference according to social situation, we included the factor “participant’s education level*partners’ sex” in the full multivariable models calculated separately for men and women.

Statistical significance was determined with two-sided alpha set at $p < 0.01$ because of the large size of the sample. All analyses were performed with the software SAS 9.4.

3. Results

Our analyses used the data collected at baseline for the participants included from February 2012 to June 2019, corresponding to 191,481 volunteers (88,843 men and 102,638 women). We selected the 172,362 responders (80,365 men and 91,997 women) who had answered the questions on sexual behaviour and had had a sexual relationship. Within this group, 12,041 (4835 men and 7206 women) did not specify the sex of their partners, so we excluded them. Finally, this study included 160,321 individuals (75,530 men and 84,791 women).

Among the participating women, 4.0% (95% CI: 3.9–4.2) had a same-sex partner in their lifetime. This percentage was higher for men: 6.3% (95% CI: 6.2–6.5).

Both men and women who had a same-sex partner had their first sexual relationship at a younger age than the other respondents, with a larger difference for women (Table 1). In particular, the proportion of those who started their sexual activity at age 15 years or younger was much higher for individuals who had at least one same-sex partner. The first sexual relation was homosexual more often for men than women (58% vs 21%, among respondents who had a same-sex partner). From these percentages, we have estimated at 3.6% (2665/74619) of all men and 0.8% (690/83825) of all women those who had their first sexual relationship with a same-sex partner.

Both men and women with same-sex partners more frequently had numerous sexual partners than those with only other-sex partners. Despite a high proportion of missing data for this information (therefore, the estimate is more fragile), 39% of men and 30% of women with same sex partners had more than 10 partners in their lifetime as compared with 14% of heterosexual men and 7% of heterosexual women. Both men and women who had homosexual relations were less often in a stable relationship at the time of the survey than those who had heterosexual relations.

Table 1
Sexual biography by partners’ sex during the lifetime among men and women.

Sexual biography characteristics	Men		P	Women		P
	Lifetime partners’ sex			Lifetime partners’ sex		
	Only other sex	Any same sex		Only other sex	Any same sex	
Age at first sex (years)	(63202)	(4557)		(74 577)	(3267)	
mean ± SD	18.3 ± 3.0	18.1 ± 3.5	<0.001	18.3 ± 2.8	17.4 ± 2.6	<0.001
	%	%		%	%	
Age at first sex						
≤ 15	10.4	18.1		8.8	22.1	
16–17	32.4	28.7		33.5	35.1	
18–19	31.7	25.2	<0.001	32.7	27.2	<0.001
20–21	14.9	15.0	<0.001 ^a	15.4	10.2	<0.001 ^a
≥ 22	10.6	13.1		9.6	5.5	
Sex of first sexual partner	(69 984)	(4635)		(80 489)	(3336)	
Men	0.0	57.5		100.0	79.3	
Women	100.0	42.5		0.0	20.7	
Number of sex partners during the lifetime	(70 753)	(4777)		(81 375)	(3416)	
1	13.1	1.2		17.8	2.1	
2	7.5	1.5		10.4	3.7	
3–5	19.1	8.1	<0.001 ^a	23.5	16.3	<0.001 ^a
6–10	16.3	13.8	<0.001 ^{a,b}	16.1	26.1	<0.001 ^{a,b}
> 10	14.0	39.3		7.3	30.0	
Unanswered, missing	30.0	36.0		24.9	21.9	
Current sexual relations with a steady partner	(67 495)	(4647)		(77 257)	(3330)	
Yes	83.2	62.8	<0.001	79.2	73.5	<0.001
			<0.001 ^a			<0.001 ^a

All CONSTANCES participants who have had sexual relations. (Numbers).

^a Statistical comparison after adjustment for age.

^b Statistical test taking into account missing values as a class of this variable.

Participants who had homosexual sex were younger than heterosexuals, more often <40 years old (Table 2). They were less frequently in a cohabiting couple relationship and more frequently in a non-cohabiting couple relationship or alone than heterosexuals. They less frequently had children. These differences were not explained by the unequal age distributions between the two groups.

The proportion of respondents of foreign nationality was low and did not differ regarding partners' sex. People with same sex partners more often lived in large cities (>200,000 inhabitants) or in the Paris area. They also had a higher level of education than those with only other sex partners.

The proportion of respondents who were employed at the time of the survey was high. For both men and women, this percentage as well as the proportion unemployed was higher among those with homosexual relations than the others. The proportion of respondents with financial difficulties was significantly higher for individuals who had homosexual relations despite their higher level of education and the fact they more often worked. All these differences remained significant after adjustment for age.

The frequency and RRs for the four psychological health indicators according to same- or other-sex partners are described in Table 3. The

frequency of current depression and lifetime suicide attempts was higher among those with same-sex partners than the others. Even if the differences were partly explained by a confounding effect of socio-demographic factors and sexual biography, they remained significant and high after adjustment when measuring risk of suicide attempts, for example: 3.9 times higher for men and 2.3 times higher for women.

Dependence on alcohol as well as regular consumption of cannabis were more frequent for both men and women who had homosexual relations than for the others. However, the differences were larger for women than men, with a RR > 2, even after adjusting for all co-factors, whereas for men, the co-factors statistically explained differences in prevalence of alcohol addiction and cannabis use. The statistical comparisons using the test of interaction showed that all these differences between men and women were significant.

For both men and women, the prevalence of depression and suicide attempts varied greatly by level of education and was lower with increasing level of education (Table 4). The proportions of alcohol dependence and cannabis use did not vary markedly by education level.

Overall, the differences by the sex of partners were comparable regardless of education level (Table 4). Thus, whatever the education level, both men and women who had homosexual relations more often

Table 2
Sociodemographic characteristics by partners' sex during the lifetime among men and women.

Sociodemographic characteristics	Men		p	Women		p
	Lifetime partners' sex			Lifetime partners' sex		
	Only other sex	Any same sex		Only other sex	Any same sex	
Age (years)	% (70 753)	% (4 777)		% (81 375)	% (3 416)	
< 30	11.1	15.3		13.5	23.5	
30–39	20.7	27.3		21.9	29.2	
40–49	23.8	27.6	<0.001	24.3	22.4	<0.001
50–59	21.5	18.5		21.1	16.1	
≥ 60	23.0	11.4		19.2	8.8	
Couple status	(69 940)	(4 747)		(80 487)	(3 392)	
Cohabitant	78.7	53.0		71.9	57.1	
Non-cohabitant	6.8	13.3	<0.001	8.0	14.6	<0.001
Not in couple	14.5	33.7	<0.001 ^a	20.1	28.3	<0.001*
Children	(69 182)	(4 717)		(79 917)	(3 372)	
Yes	61.6	20.8	<0.001	68.2	39.6	<0.001
			<0.001 ^a			<0.001 ^a
Nationality	(69 977)	(4 731)		(80 536)	(3385)	
Other than French	3.3	4.0	<0.01	3.2	3.2	NS
			NS*			NS ^a
Population of place of residence	(70 727)	(4 773)		(81 347)	(3 415)	
Rural	19.3	9.0		19.4	14.4	
≤ 200 000 inhabitants	30.1	16.8		29.4	21.4	
> 200 000 inhabitants	35.8	30.9	<0.001	35.5	36.4	<0.001
Paris area	14.9	43.3	<0.001 ^a	15.7	27.8	<0.001 ^a
Education	(69 898)	(4743)		(80 492)	(3384)	
Less than baccalaureate	27.5	13.6		19.6	11.2	
Baccalaureate	15.9	14.4	<0.001	17.2	17.6	<0.001
Baccalaureate + 1–4 years	29.6	34.0	<0.001*	40.4	40.7	<0.001 ^a
Baccalaureate + 5 or more years	27.0	38.0		22.7	30.5	
Employment status	(68 681)	(4633)		(79 154)	(3332)	
Employed	70.0	77.7		70.3	74.0	
Unemployed	5.6	7.6	<0.001	6.0	10.1	<0.001
Retired	20.2	8.3	<0.001 ^a	16.3	6.9	<0.001 ^a
Other not working ^b	4.2	6.4		7.4	9.1	
Financial difficulties	(69 990)	(4752)		(80 278)	(3377)	
Yes	10.4	13.0	<0.001	12.5	18.3	<0.001
			<0.001 ^a			<0.001*

All CONSTANCES participants who have had sexual relations. (Numbers).

^a This p-value is statistical comparison after adjustment for age.

^b Students, pensioned such as disabled persons.

Table 3

Psychological health and use of psychoactive substances by partners' sex during the lifetime among men and women. Percentages, crude and adjusted risk ratios (RRs) [95% confidence intervals].

Health indicators	Men		P	Women		P
	Lifetime partners' sex			Lifetime partners' sex		
	Only other sex	Any same sex		Only other sex	Any same sex	
Current depression (CESD>18)	(67 991)	(4663)		(77 753)	(3329)	
%	10.8	19.5	<0.001	19.4	24.9	<0.001
Age-adjusted RR	1	1.74 [1.64–1.86]	<0.001	1	1.27 [1.19–1.35]	<0.001
Adjustment 1 RR	1	1.64 [1.54–1.75]	<0.001	1	1.24 [1.17–1.32]	<0.001
Adjustment 2 RR	1	1.55 [1.45–1.66]	<0.001	1	1.21 [1.13–1.29]	<0.001
Suicide attempt lifetime	(68 129)	(4599)		(78 024)	(3295)	
%	1.1	4.0	<0.001	2.4	5.9	<0.001
Age-adjusted RR	1	3.85 [3.28–4.51]	<0.001	1	2.74 [2.38–3.16]	<0.001
Adjustment 1 RR	1	4.34 [3.64–5.17]	<0.001	1	2.87 [2.47–3.33]	<0.001
Adjustment 2 RR	1	3.91 [3.26–4.69]	<0.001	1	2.34 [2.00–2.73]	<0.001
Alcohol dependency (AUDIT≥16*)	(70 625)	(4772)		(81 162)	(3414)	
%	3.1	5.4	<0.001	0.8	4.0	<0.001
Age-adjusted RR	1	1.56 [1.38–1.77]	<0.001	1	4.17 [3.48–5.01]	<0.001
Adjustment 1 RR	1	1.27 [1.11–1.45]	<0.001	1	3.36 [2.78–4.07]	<0.001
Adjustment 2 RR	1	1.05 [0.91–1.20]	NS	1	2.27 [1.85–2.78]	<0.001
Cannabis regular use ^a	(68 320)	(4674)		(77 740)	(3353)	
%	4.0	7.3	<0.001	1.4	6.8	<0.001
Age-adjusted RR	1	1.44 [1.29–1.61]	<0.001	1	3.60 [3.14–4.13]	<0.001
Adjustment 1 RR	1	1.29 [1.15–1.44]	<0.001	1	3.15 [2.73–3.63]	<0.001
Adjustment 2 RR	1	1.02 [0.91–1.14]	NS	1	2.09 [1.80–2.43]	<0.001

All CONSTANCES participants who have had sexual relations, (Numbers); RR, risk ratio.

Adjustment 1: age, children, education, size of place of residence, nationality.

Adjustment 2: age, children, education, size of place of residence, nationality, age at first sex, more than 10 sexual partners during the lifetime. Using these same full models the “respondent’s sex*partners’ sex” interaction on the association with psychological health is significant for the four indicators of the table: p<0.001.

^a Use ≥12 times in the last 12 months.

had suicide attempts than other men and women. For men, the excess risk of dependence on alcohol or regularly using cannabis was not significant after adjustment but was clearly significant for women, regardless of education level. The statistical test of interaction showed no different impact of having had a same-sex partner, whatever the education level, on depression, suicide attempts and alcohol dependence for men and women. For regular cannabis use, the excess risk linked to the sex of the partner was greater for women than men, especially in relation to a low level of education; the interaction “education level*partners’ sex” on the association with the psychological health indicators was significant. The trend was identical for men, although not significant and without interaction with educational level.

4. Discussion

Our results show a higher frequency of men than women who had homosexual sex. This is the first estimate produced with such a large sample in France. From other studies in the general population in France, we note a relative stability of these frequencies for both sexes (Table 5). However, the databases available did not cover the same age range and did not have the same data collection method. In all these surveys no definition of “sex” or “sexual relation” had been given in the questionnaires. Nevertheless in a large quantitative study on sexual behaviour of young people – 15 to 18 years old (Lagrange & Lhomond, 1997) in which were listed several sexual acts, penetrative or not, we showed that young people, boys and girls, who had their first sexual relation with a same sex partner did not consider that penetration was a necessity to answer they had sex. On the contrary, for those who had their first relation with a partner of the other sex, coitus was almost necessary to report having had a sexual relation (Lhomond, 1996).

4.1. Strengths and limitations of this study

These results are based on recent data collected from a large sample in France, which allows for providing precise frequency estimates. The

data were obtained with self-administered questionnaires. For sensitive issues such as sex of partners, suicide attempts or heavy alcohol consumption, this process avoids a desirability bias that might have occurred with a face-to-face or phone interview. The sample size allowed us to analyse outcomes of low frequency (suicide attempts or alcohol dependence) in relation to homosexual behaviour, also of low frequency. However, although very large, this sample cannot be considered representative of the population residing in France. In particular, we know that, following the invitation, participation in the survey was higher for men and older people than for women and younger people (Santin et al., 2016). The probability of participation was associated with social category: lower for manual workers than managers and higher for people with a high-income job than those without a job. The selection is due to various mechanisms: mainly the willingness to respond to the CONSTANCES study but also the geographic location of the health examination centres, which were more or less distant from the homes of the people targeted to participate. Moreover, for the present analysis, non-responses to certain questions may increase the bias.

Estimates over the first years of inclusion in CONSTANCES suggest an underestimation of the prevalence of the health outcomes: for instance, the frequencies of current tobacco use and depression were lower for our respondents than the target population (Santin et al., 2016). However, we know nothing of the impact of the selection regarding information on the sex of partners during the life course. It is difficult to hypothesise in which direction these selection mechanisms may have affected our results regarding the associations between partners’ sex and psychological health because we do not have data on the sexual partners of non-respondents.

The study has benefitted from the numerous health data collected. The survey included the Center for Epidemiologic Studies Depression Scale in its complete form, with little missing data on the 20 items. In line with other studies, we chose a threshold score of 19 to define a depressive state, identical for men and women (Airagnes et al., 2019). This point seems especially important for the present analysis. If we

Table 4

Psychological health and substance use by partners' sex during the lifetime stratified for education level among men and women. Percentages and adjusted risk ratios (RRs) [95% confidence intervals].

	Men		p	Women		p
	Lifetime partners' sex			Lifetime partners' sex		
	Only other sex	Any same sex		Only other sex	Any same sex	
Current depression (CESD>18)	(67 280)	(4634)		(77 033)	(3305)	
Education = baccalaureate or less	14.0%	27.7%	<0.001	26.8%	34.2%	<0.001
Adjusted RR	1	1.51 [1.31–1.74]	<0.001	1	1.10 [0.94–1.28]	NS
Baccalaureate + 1–4 years	10.7%	20.9%	<0.001	18.8%	25.2%	<0.001
Adjusted RR	1	1.55 [1.41–1.70]	<0.001	1	1.19 [1.09–1.29]	<0.001
Baccalaureate + 5 or more years	8.0%	14.9%	<0.001	15.0%	21.1%	<0.001
Adjusted RR	1	1.48 [1.30–1.69]	<0.001	1	1.29 [1.13–1.46]	<0.001
			NS			NS
Suicide attempt lifetime	(67 304)	(4565)		(77 181)	(3265)	
Education = baccalaureate or less	1.9%	7.8%	<0.001	4.2%	12.4%	<0.001
Adjusted RR	1	3.60 [2.63–4.92]	<0.001	1	2.42 [1.77–3.31]	<0.001
Baccalaureate + 1–4 years	1.0%	4.6%	<0.001	2.2%	5.7%	<0.001
Adjusted RR	1	4.09 [3.15–5.29]	<0.001	1	2.12 [1.71–2.61]	<0.001
Baccalaureate + 5 or more years	0.5%	1.8%	<0.001	1.3%	4.1%	<0.001
Adjusted RR	1	3.10 [1.94–4.96]	<0.001	1	2.58 [1.82–3.67]	<0.001
			NS			NS
Alcohol dependency (AUDIT ≥16)	(69 779)	(4738)		(80 291)	(3382)	
Education = baccalaureate or less	3.3%	8.4%	<0.001	0.6%	3.2%	<0.001
Adjusted RR	1	1.56 [1.18–2.08]	<0.01	1	2.54 [1.26–5.11]	<0.01
Baccalaureate + 1–4 years	3.2%	5.8%	<0.001	0.8%	4.2%	<0.001
Adjusted RR	1	1.05 [0.86–1.27]	NS	1	2.23 [1.72–2.87]	<0.001
Baccalaureate + 5 or more years	2.7%	3.6%	<0.001	0.9%	4.0%	<0.001
Adjusted RR	1	0.75 [0.57–0.98]	<0.05	1	2.22 [1.54–3.22]	<0.001
			<0.01			NS
Cannabis regular use ^b						
Education = baccalaureate or less	3.0%	8.1%	<0.001	0.7%	7.5%	<0.001
Adjusted RR	1	1.29 [0.95–1.75]	NS	1	2.95 [1.82–4.77]	<0.001
Baccalaureate + 1–4 years	4.8%	8.3%	<0.001	1.4%	7.6%	<0.001
Adjusted RR	1	1.01 [0.87–1.18]	NS	1	2.27 [1.89–2.74]	<0.001
Baccalaureate + 5 or more years	3.7%	5.7%	<0.001	1.6%	5.0%	<0.001
Adjusted RR	1	0.90 [0.72–1.12]	NS	1	1.49 [1.10–2.03]	<0.01
			NS			<0.01

All CONSTANCES participants who have had sexual relations, (Numbers).

Adjusted RR = adjustment for age, children, size of place of residence, nationality, age at first sex, more than 10 sexual partners during the lifetime.

NS, not significant.

^a Statistical interaction “partners' sex * education level” on the association with the psychological health indicators using a Wald's test in the multivariate models.

^b Use ≥12 times in the last 12 months.

^c Statistical interaction “education level*partners' sex” on the association with the psychological health indicators using a Wald's test in the multivariate models.

Table 5

Percentage of respondents with any same sex behaviour during the lifetime in different studies in France.

Studies	Method of data collection	Age of respondents	Any same-sex partners	
			Men	Women
CONSTANCES, 2013–2019	Self-administered questionnaire	≥18 years	(75 530) 6.3%	(84 791) 4.0%
			[6.2–6.5]*	[3.9–4.2]*
CSF, 2005–2006 (Bajos & Bozon, 2008)	Phone interview	18–69 years	(5540) 4.0%	(6824) 3.9%
			[3.5–4.6]*	[3.5–4.5]*
ACSF, 1992 (Spira et al., 1993)	Phone interview	18–69 years	(2595) 4.1%	(2088) 2.6%
Rapport Simon, 1972 (Simon et al., 1972)	Face-to-face interview	>18 years	(1250) 6.0%	(1375) 3.0%

(Numbers) *percentage [95% confidence interval].

CSF for Contexte de la Sexualité en France (Context of Sexuality in France).

ACSF for Analyse des Comportements Sexuels en France (Analysis of Sexual behaviours in France).

admit that the frequency of depressive state is higher for women than men, a hypothesis that could justify the use of a higher threshold for women, we would have underestimated the frequency of this symptom for women.

Similarly, alcohol dependence is measured with a specialized scale, a

full version of the Alcohol Use Disorders Identification Test (Babor et al., 2001), which is of much higher quality than an isolated question on “alcoholism” or “treatment for alcoholism”. We could not limit suicide attempts to those in the last 5 years because of their rarity, so we chose to use the lifetime reference period. For the other three health indicators, a measure of current health was preferred to ensure that exposure (same-sex partner) preceded outcome (psychological health) for almost all participants.

The CONSTANCES survey collected many social and demographic data, which we included in our study. To not exclude a large number of subjects from the multivariate analyses, we chose to keep a class of missing data for the number of sexual partners during the lifetime. The comparison of this factor according to whether or not the respondents had had homosexual relations is weakened by the number of missing data mainly due to refusals to answer to this specific question.

The main limitation is the sexual orientation indicator. In this database, we had only the question about the sex of partners. This question seems to be more objective than those on sexual attraction and self-definition such as homosexual or bisexual. However, we are well aware of the multidimensionality of sexuality (Lindley et al., 2012) as discussed previously (Lhomond et al., 2014).

Concerning the statistical analysis, we chose to provide several results, calculated using different multivariate models. For the adjustments shown in Tables 3 and 4, there is a possible over adjustment when taking into account certain elements of the biography (having or not

having children, number of sexual partners) when we observe to what extent these elements vary according to whether the women or men had homosexual relationships. If so, the true excess risk is larger than the one we show, closer to the risk ratio adjusted only for age.

Risk of alcohol addiction and cannabis use was greatly increased for women who had homosexual relations, even after adjustment for social, demographic and sexual life factors, as found by other studies (Hughes et al., 2020) but this was not the case for men. However, risk of depression and suicide attempts was increased for men who had homosexual relations; this finding was also true for women but to a lesser extent.

The scientific literature clearly shows differences in the associations “partners’ sex” and “mental distress” between men and women (Lhomond & Saurel-Cubizolles, 2009; Bostwick et al., 2010; El Khoury et al., 2021). Hence, we tested the interactions between respondent’s sex and partners’ sex in the four complete models for each of the mental health indicators. These were always significant, which allowed us to comment on a difference in the amplitude of the excess risk between the two sexes.

Risk of consumption of psychoactive substances by women who had female partners, higher than the one of other women and close of the one of heterosexual men, can be explained by a distance from gender norms they can reject more often and a form of rupture with social expectations attached to their gender.

The higher risk of depression and suicide attempts for men who had same sex partners can be linked to a higher risk of verbal or physical violence they undergo (Duchene et al., 2021). If men and women with homosexual relations are more often subjects to stigmatisation, discrimination and violence than their heterosexual counterparts, it seems that they do not answer in the same manner to the stress they face (Meyer, 2003).

Our results show that the risks of mental distress were similar and estimates remained unchanged if we divided the population into three social distinct situations defined by education level. Several studies have shown that certain subgroups of the population have a wider range of risk for psychological distress or addiction related to homosexual behaviour than others. For example, subgroups can be defined by ethnicity, with the underlying hypothesis of discrimination linked to membership in some minority groups (Blacks, Hispanics, Maoris, depending on the country where the study was carried out), to which could be added a more or less strong stigmatisation due to homosexual behaviour (Drazdowski et al., 2016; Sutter & Perrin, 2016). We wanted to test the possible effect of social class on the magnitude of risk related to homosexual behaviour. For this purpose, we selected the level of education, a relevant indicator for the social conditions existing since early adulthood. We thought that the processes of discrimination, stigmatisation or ostracism (family, leisure, work) for people who have homosexual relations could be greater in the less-educated than more-educated groups and therefore these processes would lead to a poorer psychological health. The results do not support this hypothesis since we observed the same level of excess risk of psychological distress depending on the sex of the partners, regardless of the level of education attained, yet in the context of a general population with strong social inequalities of depression and suicide attempts, as attested by our results, those of colleagues using the same survey (Melchior et al., 2018) and numerous publications (Chan Chee et al., 2011; Jacquet et al., 2018). The mechanisms implied in the greater psychological distress of people with same-sex partners seem similar whatever their position in the social hierarchy. The data, the available information and the analysis we have carried out would have shown heterogeneity of results according to the level of education if such social heterogeneity existed. Social pressures against homosexuals, even of different nature, are probably equally frequent in the different segments of society, for the generations included in our observation. It is possible that the manner to face isolation or discrimination linked to homosexuality may vary along the social hierarchy; but the translation into psychological symptoms - distress, possibly intense to the point of acting out - appears to be of

equal frequency. Qualitative studies could explore this issue and show the possible diversity of these social or family pressures in their expressions.

This study helps increase the knowledge about the health of sexual minority populations. It can help clinicians pay more attention to certain discomforts expressed by patients and alert legislators to the effects of discrimination and stigmatisation caused by same-sex sexual behaviour, whatever the social situation is.

Ethical statement

The CONSTANCES cohort obtained the authorization of the national data protection authority (*Commission Nationale de l’Informatique et des Libertés*) (no. 910486) and was approved by the institutional review board of the National Institute for Health and Medical Research.

The authors thank all the CONSTANCES participants for answering the questionnaires. They thank Monique Kaminski and Laetitia Marchand-Martin for their comments and advice on this text and Adeline Renuy and Sofiane Kab for their help in the use of data. BL and MJJS thank all the staff who contributed to the CONSTANCES study and helped make the data available.

Authors’ statement

Saurel-Cubizolles MJ: writing, original draft preparation, conceptualization of the analysis, statistical analysis of data and editing;

Lhomond B: writing, original draft preparation, conceptualization of the analysis and editing;

Coeuret-Pellicier M on behalf the CONSTANCES survey group: provision of data, advice on manuscript.

Fundings

The CONSTANCES survey is supported by the Caisse Nationale d’Assurance Maladie des travailleurs salariés-CNAMTS and was funded by the Institut de Recherche en Santé Publique/Institut Thématique Santé Publique, and the following sponsors: Ministère de la Santé et des sports, Ministère délégué à la recherche, Institut national de la santé et de la recherche médicale, Institut national du cancer et caisse nationale de solidarité pour l’autonomie.

Data availability

Data will be made available on request.

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