General review

Sexual orientation and mental health: A review

Orientation sexuelle et santé mentale : une revue de la littérature

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Abstract

Background. – The aim of this paper is to review the available knowledge on sexual orientation and mental health, especially for women.
Methods. – Papers published in English or French, between 1997 and 2007, were selected in PubMed using the following keywords: homosexuality/sexual orientation and mental health/depression/suicide. To be retained, papers had to contain findings from quantitative surveys comparing homosexual and heterosexual adults. In all, this review analyzes 22 papers, including two that are based on the same survey.
Results. – This review found a general pattern of poorer mental health for homosexuals, accentuated for bisexuals, compared to heterosexuals. The results are especially consistent regarding the elevated risk of suicide attempts.

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Keywords: Sexual orientation; Sexual behaviours; Mental health; Suicide

Résumé

Position du problème. – Le but de cet article est de faire le point des connaissances disponibles sur l’orientation sexuelle et la santé mentale, en particulier pour les femmes.
Résultats. – Cette revue montre un tableau cohérent d’une moins bonne santé mentale pour les personnes homosexuelles et surtout bisexuelles. Les études sont particulièrement convergentes à propos du risque plus élevé de tentatives de suicide.

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Mots clés : Orientation sexuelle ; Comportements sexuels ; Santé mentale ; Suicide

1. Introduction

Over the last two decades, studies on homosexuals’ health have multiplied, essentially in the English-speaking countries, particularly the United States. The HIV epidemic has driven a number of them, which implies that the great majority studied men and sexually transmitted infections, as shown by Ulrike Boehmer’s review [1]. Another, older line of research, centered on homosexuality as a problem, has undergone major transformations. Until the 1950s, the presupposition of the majority of these studies was that homosexuality as such was a mental illness, following the ideas of certain theoreticians in psychiatry dating from the middle of the 19th century. Since that time, there has been heated debate between those with a pathological vision, for example Krafft-Ebing [2], and the defenders of a point of view that today could be qualified as essentialist, in which homosexuality is viewed as a given of nature, for example Hirschfeld [3]. Institutions such as the American Psychiatric Association and the World Health Organization considered homosexuality a mental disease, until 1974 for the former and 1993 for the latter. The pioneering work of Evelyn Hooker on homosexual men in the 1950s [4]
and Saghir et al. [5] on women in the United States challenged the idea of pathology that had been widely accepted, as evidenced by the autobiography of Martin Duberman [6], for example, by showing that homosexuals did not themselves present differences in mental health compared to heterosexuals. Moreover, surveys on sexual behavior since Kinsey et al. [7,8] modified the perception, on the part of scientists as well as the general public, of the frequency of homosexual behavior and demonstrated that a continuum existed between different expressions of sexuality [9,10].


In scientific work as well as in political movements, homosexuality has often referred exclusively to male homosexuality. Social inequality between men and women is also evident in the realm of homosexuality. Compulsory heterosexuality, which weighs more heavily on women, and legal and social stigmatization, which is exerted more often on men, are both examples of the differential treatment of gays and lesbians.

Current research on homosexuals’ mental health is the heir of these divergent perspectives. In general, we have gone from a majority vision of homosexuality as a psychiatric disorder to the mental health of homosexuals as a question of public health. Nevertheless, this research topic remains underdeveloped, especially in France. For the last few years, demands for greater knowledge on all the health questions concerning gays and lesbians have been emerging, as shown for example by the editorials of two special issues of the American Journal of Public Health in 2001 and 2008 [13,14].

Understanding the social evolution and transformations of scientific paradigms concerning homosexuality enables us to place the research of the last 10 years, the subject of this review, into its historical perspective. Before then, few studies on the general population (no questions on sexual behavior and orientation) or in the homosexual community (no comparison group) put the relations between sexual orientation and mental health into perspective, explaining our choice of a recent period during which these studies, methodologically more elaborated, have developed.

The aim of this paper is to present the results and the possible explanatory hypotheses on the relations between sexual orientation and mental health. The notion of sexual orientation, as understood herein, concerns all individuals. It differentiates heterosexuals, the majority sexual orientation constructed as the social norm, and homosexuals or bisexuals, the minority orientation as much in number as in a discredited social position. Sexual orientation is understood as the manner in which individuals define themselves, beyond the sex of their partners. In this article, the terms “homosexual,” “bisexual,” and “heterosexual” are used as specific modalities of sexual orientation.

Literature reviews on the health of gays and lesbians began being published at the beginning of the 2000s. They were either very general, encompassing all the questions of health and therefore insufficiently developed in terms of mental health [15–17], or centered only on suicide risk [18–20]. Others did not seek to provide a systematic report on the literature, while putting into perspective a number of quantitative surveys and clinical studies [21,22]. Two reviews were published in 2005 and 2008, one in French analyzing articles from 1993 to 2004 [23] and the other in English reviewing articles from 1996 to 2005 [24].

The present review includes more recent studies and includes more European investigations. It aims to analyze the problems raised by the variability of indicators used in studies to measure sexual orientation, to compare the results on mental health in relation to these indicators and mental health scales, and to consider studies on mental health as well as those on suicide risk.

2. Review method

Articles published in English or French, from 1997 to 2008, were selected in Pub Med using the following keywords: homosexuality/sexual orientation and suicide/depression/mental health. To be retained, the articles had to present results from quantitative studies, comparing the situation of “homosexual or bisexual” adults to “heterosexual” adults. The way different groups are defined will be analyzed below.

All the articles presenting data on women or both sexes were retained. Those centered only on men, often related to HIV infection, were not included. Four articles concerning only men responded to our selection criteria (two on suicide risk [25,26] and two on general mental health [27,28]). This choice to exclude them was dictated by the wish to shed light on the analyses on women, who are fewer in number and not given as much attention.

Many articles on “young” populations, in school or socially disconnected, were not retained here because they warrant a distinct review. Certain results, primarily on suicide risk, are available in French [29,30]. Moreover, sexuality and sexual orientation, in development at this age, are still labile and, for many young people, a source of uncertainty and questioning, and need a specific analysis.

Altogether, this review analyzes 22 articles [31–52], two of which came from the same database. The information drawn from these articles is described in three tables: Table 1 presents the surveys and sample populations, Table 2 the indicators of sexual orientation or behaviors and their distribution, and Table 3 the health indicators, the factors related to the context of the analysis, and the main results.

3. Results

3.1. What type of survey?

The data, collected after the middle of the 1990s, comes for the most part from English-speaking countries (Table 1). Of the
Table 1
Description of the studies and samples analyzed in the articles.

<table>
<thead>
<tr>
<th>Articles authors, year of publication, survey name</th>
<th>Country, city of survey</th>
<th>Year data collected</th>
<th>Type and size of overall sample</th>
<th>Data collection method (response rate)</th>
<th>Sex, characteristics, and age of subjects (size of sample analyzed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hugues et al. [31] Chicago Women’s Health Survey</td>
<td>US Chicago</td>
<td>1994–95</td>
<td>Social, community, friends and co-worker networks plus snowball effect for heterosexuals $n = 428$</td>
<td>Self-questionnaire (50%)</td>
<td>Women ($n = 418$) Mean age: 42 years</td>
</tr>
<tr>
<td>Clermont and Lacouture [32] Enquête sociale et de santé 1998</td>
<td>Canada, Quebec</td>
<td>1998</td>
<td>Provincial representative $n = 30,386$</td>
<td>Administered and self-administered questionnaires</td>
<td>Women and men ($n = 16,743$), sexually active 15 years and over</td>
</tr>
<tr>
<td>Cochran and Mays [33] National Household Survey of Drug Abuse (NHSDA)</td>
<td>US</td>
<td>1996</td>
<td>National representative $n = 12,387$</td>
<td>Face-to-face interview</td>
<td>Women and men ($n = 9908$), sexually active 12 months, 18 years and over</td>
</tr>
<tr>
<td>Valanis et al. [34] Women’s Health Initiative (WHI)</td>
<td>US</td>
<td>1993–97</td>
<td>Randomized and cohort trials $n = 161,859$</td>
<td>Questionnaire, self questionnaire and interviews</td>
<td>Women ($n = 93,311$) 50–79 years</td>
</tr>
<tr>
<td>Gilman et al. [35] National Comorbidity Survey</td>
<td>US</td>
<td>1990–92</td>
<td>Household survey $n = 8098$</td>
<td>Face-to-face interview (82.4%)</td>
<td>Men ($n = 2384$) 15–54 years</td>
</tr>
<tr>
<td>Rothblum and Factor [36]</td>
<td>US</td>
<td>1997–98</td>
<td>Snowball effect, volunteers and their sisters through lesbian organizations $n = 762$</td>
<td>Postal questionnaire (60 %)</td>
<td>Women ($n = 762$) 20–70 years 184 pairs of sisters</td>
</tr>
<tr>
<td>Sandfort et al. [37] Netherlands Mental Health Survey and Incidence Study (NEMESIS)</td>
<td>Netherlands</td>
<td>1996</td>
<td>National representative $n = 7076$</td>
<td>Face-to-face interview (69.7%)</td>
<td>Women ($n = 3120$) 18–64 years</td>
</tr>
<tr>
<td>Jorm et al. [38] Personality and Total Health (PATH) Through Life Project</td>
<td>Australia, Canberra and Queanbeyan</td>
<td>1999–2001</td>
<td>Random based on electoral rolls $-20–24$ years, $n = 2404$ $-40–44$ years, $n = 2530$</td>
<td>Computerized self-questionnaire with researcher (58.6% $(64.6%)$</td>
<td>Women and men 20–24 years: $n = 2331$ 40–44 years: $n = 2493$</td>
</tr>
<tr>
<td>Cochran et al. [40] Midlife Development in the United States (MIDUS)</td>
<td>US</td>
<td>1995</td>
<td>National random sample $n = 3032$</td>
<td>Telephone interview plus postal questionnaire (61%)</td>
<td>Women ($n = 1641$) Men ($n = 1276$) 25–74 years</td>
</tr>
<tr>
<td>Diamant and Wold [41] Los Angeles County Health Survey (LACHS)</td>
<td>US Los Angeles</td>
<td>1999</td>
<td>Random sample, general population $n = 4223$</td>
<td>Telephone interview (55%)</td>
<td>Women ($n = 4135$) 18–64 years</td>
</tr>
<tr>
<td>King et al. [42]</td>
<td>England and Wales</td>
<td>2000–02</td>
<td>Snowball effect $n = 2430$</td>
<td>Computerized self-questionnaire</td>
<td>Women and men ($n = 2179$) 16 years and over</td>
</tr>
<tr>
<td>Reference</td>
<td>Country</td>
<td>Year</td>
<td>Study Characteristics</td>
<td>Methodology</td>
<td>Response Characteristics</td>
</tr>
<tr>
<td>-------------------------------</td>
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<tr>
<td>Skegg et al. [43]</td>
<td>New Zealand</td>
<td>1998</td>
<td>Birth cohort</td>
<td>Computerized questionnaire and face to face interview</td>
<td>Women ($n = 462$) Men ($n = 480$) 26 years</td>
</tr>
<tr>
<td>Dunedin Multidisciplinary Health and Development Study</td>
<td></td>
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<tr>
<td>Case et al. [44]</td>
<td>US</td>
<td>1993–95</td>
<td>Cohort</td>
<td>Postal questionnaire</td>
<td>Women, nurses ($n = 90,823$) 32–51 years</td>
</tr>
<tr>
<td>Nurse’s Health Study 2 (NHS2)</td>
<td>14 states</td>
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</tr>
<tr>
<td>Balsam et al. [45]</td>
<td>US</td>
<td>Not reported</td>
<td>Snowball effect; volunteers and siblings, by homosexual newspapers and organizations $n = 1254$</td>
<td>Postal questionnaire</td>
<td>Women ($n = 805$) Men ($n = 449$) Mean age: 31–39 years</td>
</tr>
<tr>
<td>McNair et al. [46]</td>
<td>Australia</td>
<td>2000–01</td>
<td>Cohort</td>
<td>Self-questionnaire</td>
<td>Women 22–27 years $n = 9260$ 50–55 years $n = 10,299$</td>
</tr>
<tr>
<td>Australian Longitudinal Study on Women’s Health (ALSWH)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lhomond and Saurel-Cubizolles [47]</td>
<td>Metropolitan France</td>
<td>2000</td>
<td>National representative $n = 6970$</td>
<td>Telephone interview (82%)</td>
<td>Women, sexually active $(n = 6410)$ 20–59 years</td>
</tr>
<tr>
<td>Enquête nationale sur les violences envers les femmes en France (ENVEFF)</td>
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<tr>
<td>King and Nazareth [48]</td>
<td>Great Britain</td>
<td>Not reported</td>
<td>Patients from 13 family practices $n = 1512$</td>
<td>Self-questionnaire (71 %)</td>
<td>Women $(n = 1045)$ Men $(n = 434)$ 18–75 years</td>
</tr>
<tr>
<td>London</td>
<td></td>
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<tr>
<td>De Graaf et al [49]</td>
<td>Netherlands</td>
<td>1996</td>
<td>National representative $n = 7076$</td>
<td>Face-to-face interview (69.7 %)</td>
<td>Women $(n = 3120)$ Men $(n = 2878)$ Sexually active 12 months 18–64 years</td>
</tr>
<tr>
<td>NEMESIS</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Koh and Ross [50]</td>
<td>US</td>
<td>1996–97</td>
<td>33 Healthcare sites (private medical offices, lesbian health clinics) $n = 1362$</td>
<td>Self-questionnaire (50 %)</td>
<td>Women $(n = 1304)$ Mean age: 36–41 years</td>
</tr>
<tr>
<td>Jouvlin et al. [51]</td>
<td>Metropolitan France</td>
<td>2004–05</td>
<td>National representative $n = 30,514$</td>
<td>Telephone interview</td>
<td>Women $(n = 7241)$ Men $(n = 5925)$ 15–75 years</td>
</tr>
<tr>
<td>Baromètre Santé 2005</td>
<td></td>
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</tr>
<tr>
<td>Jouvin et al. [51]</td>
<td>Metropolitan France</td>
<td>2004–05</td>
<td>National representative $n = 30,514$</td>
<td>Telephone interview</td>
<td>Women $(n = 7241)$ Men $(n = 5925)$ 15–75 years</td>
</tr>
<tr>
<td>Baromètre Santé 2005</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cochran and Mays [52]</td>
<td>US</td>
<td>2004–05</td>
<td>Regional representative $n = 2322$</td>
<td>Telephone interview (56%)</td>
<td>Women $(n = 1172)$ Men $(n = 1099)$ 18–70 years</td>
</tr>
<tr>
<td>California Quality of Life Survey</td>
<td>California</td>
<td></td>
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</tr>
</tbody>
</table>
Table 2
Indicators of sexual orientation or behavior and frequency.

<table>
<thead>
<tr>
<th>Articles</th>
<th>Indicator of homo- or heterosexuality and numbers</th>
<th>Homosexuality or bisexuality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[31]</td>
<td>Sexual attraction; sexual behavior, 12 months</td>
<td>NA</td>
</tr>
</tbody>
</table>
|          | Lesbian: be only or mostly attracted to women or having had sex only or mostly with women in the past year \( (n = 284) \)  
|          | Heterosexual: same definition with men \( (n = 134) \) |                                  |
| [32]     | Current sexual behavior (partners’ sex)            |                                  |
|          | Partners of opposite sex, same sex, both sexes     |                                  |
| [33]     | Sexual behavior (partners’ sex, 12 months)         | 1.6 (one or several partners of the same sex, 98 men and 96 women) |
|          | Partners of opposite sex \( (n = 135) \), same sex \( (n = 59) \) |                                  |
| [34]     | Sexual behavior (partners’ sex): 5 classes         |                                  |
|          | Heterosexuals: only male partners entire life \( (90,578) \) |                                  |
|          | Bisexuals: male and female partners lifetime \( (740) \) |                                  |
|          | Lesbians lifetime: only female partners \( (264) \) |                                  |
|          | Lesbians in adulthood: only female partners after 45 years \( (309) \) |                                  |
|          | No adult sex \( (1420) \) |                                  |
| [35]     | Sexual behavior (partners’ sex, 5 years)           | 1.8                             |
|          | 51 women and 74 men: any same sex partner | Men: 2.1                       |
|          |                                                   | Women: 1.5                      |
| [36]     | Self-definition, Kinsey 8-point scale 8 \( (0–7) \) | NA                              |
|          | Heterosexuals \( (0–1) \): \( n = 315 \), bisexuals \( 2–5 \): \( n = 133 \), lesbians \( 6–7 \): \( n = 314 \) |                                  |
| [37]     | Sexual behavior (partners’ sex, 12 months)         |                                  |
|          | 43 women and 82 men had same sex partners |                                 |
| [38]     | Self-definition                                   |                                  |
|          | Heterosexual \( (4675) \)                          |                                  |
|          | Homosexual \( (78) \)                              |                                  |
|          | Bisexual \( (71) \)                                |                                  |
| [39]     | Current attraction (5-point scale) and sexual behavior 12 months (5-point scale) combined: | NA                              |
|          | Heterosexuals \( (n = 279) \), lesbians \( (n = 550) \). Bisexuals \( (n = 33) \) excluded from analysis |                                  |
| [40]     | Self-definition                                    |                                  |
|          | Heterosexual \( (2844) \), homosexual \( (41) \), bisexual \( (32) \) |                                  |
| [41]     | Self-definition                                    |                                  |
|          | Heterosexual \( (4 023) \), lesbian \( (43) \), bisexual \( (69) \) |                                  |
| [42]     | Self-definition                                    |                                  |
|          | Homosexual: 656 men, 430 women                     |                                  |
|          | Heterosexual and bisexual: 505 men, 588 women      |                                  |
| [43]     | Past and current attraction: 6-point scale         | NA                              |
|          | Opposite-sex attraction: 427 men, 343 women        |                                  |
|          | Same sex attraction grouped for analysis: 119 women, 53 men |                                  |
| [44]     | Self-definition                                    |                                  |
|          | Heterosexual \( (89,812) \), lesbian, gay, or homosexual \( (694) \), bisexual \( (317) \) |                                  |
| [45]     | Self-definition                                    |                                  |
|          | Heterosexual: 348 women, 185 men                   |                                  |
|          | Lesbian or gay: 332 women, 226 men                  |                                  |
|          | Bisexual: 125 women, 38 men                        |                                  |
| [46]     | Self-definition: 5-point scale                     |                                  |
|          | Exclusively heterosexual: 8482 young, 10 035 older  | Women, 22–27 years               |
|          | Mainly heterosexual: 634 young, 122 older           | 6.8                             |
|          | Bisexual: 75 young, 16 older                       | 0.8                             |
|          | Mainly homosexual: 32 young, 19 older               | 0.3                             |
|          | Exclusively homosexual: 60 young, 107 older         | 0.6                             |

21 surveys included in this review, 12 were carried out in the United States, two in Australia, two in Great Britain, two in France, and one each in the Netherlands, New Zealand, and Canada (Quebec).

The studies can be grouped into two broad categories: on one hand, secondary analyses of data collected as part of larger, often national surveys, generally investigating health issues, with large randomly selected samples (14 surveys). In this case, the data were most often gathered in face-to-face or telephone interviews. On the other hand, surveys in homosexual environments with a heterosexual comparison group generally study smaller samples and use self-administered questionnaires.

The majority of the surveys (13) included men and women, for both categories described above.

The surveys investigated the adult population, with variable age ranges. Four cohorts of specific ages or age groups were retained. The Women's Health Initiative (WHI) [34] investigated women from 50 to 79 years of age.

3.2. How is homosexuality defined? How frequent is it in the population studied?

The indicators used in the different surveys to define homosexuality, bisexuality, and heterosexuality varied (Table 2). Nonetheless, they are all constructed based on one or several of the following three indicators: attraction for one or the other sex, sexual behaviors – specifically, sexual partners' sex – and self-definition, even if the time periods and the grouping were diverse.

Half of the surveys used self-definition as an indicator of sexual orientation: labeling oneself as homosexual, gay, or lesbian, bisexual or heterosexual is the criterion distinguishing the groups to compare. This is the case for the majority of the surveys carried out in the homosexual community (five out of seven) and nearly half of those conducted in the general population (six out of 14).

The other surveys considered only the sex of sexual partners to define the indicator either during preceding year [32,33,37,51], during the last 5 years [35], or during the subject's lifetime [34,47].

A single survey [43] used only attraction for one or the other sex. This attraction, measured on a six-point scale, close to the scale proposed by Kinsey et al. [7,8], took into account current and past attraction. Two studies combined attraction and sexual behaviors [31,39] and a third, behavior and self-definition [52].

Several studies showed that these indicators are congruent but do not entirely overlap [53,54]. Nevertheless, the analyses conducted generally compared two, sometimes three groups and breakdowns in terms of time periods and partner exclusivity were grouped together mainly because these groups were small.

In terms of rates of homosexuality or bisexuality, only the surveys with a representative sample could be used. Depending on the study, homosexuals and bisexuals were grouped or considered separately. When the sexual behavior of the last 12 months was taken into account, the percentages of homosexual and bisexuals oscillated between 1 and 2% for women and around 3% for men. When considering the respondents' self-definition, the rates of homo- and bisexuality ranged from 1 to 4% for women and were around 3% for men.

Only the Australian survey [38] reported a higher percentage of women defining themselves as homosexual than men. This result was also found in the survey on sexual behavior in Australia [55]. On the other hand, this was not observed in any other country [10].

The choice of the indicator does not seem to have a determining influence on the declaration rate of homo- or
Table 3
Health indicators, context factors, and main results.

<table>
<thead>
<tr>
<th>Articles</th>
<th>Health problems studied and reference period</th>
<th>Mental health measurement tools</th>
<th>Context factors taken into account in analysis</th>
<th>Main results</th>
</tr>
</thead>
<tbody>
<tr>
<td>[31]</td>
<td>1. Alcohol and dependence 2. Depression (seeking counselling or antidepressants) 3. Suicidal thoughts and suicide attempts 4. Use of mental health services</td>
<td>Ad hoc questions</td>
<td>None</td>
<td>1. Lesbians have an alcohol problem in the past more often than heterosexuals but their current consumption rate is similar. 2. No difference for history of depression between lesbians (49%) and heterosexuals (47%). 3. Lifetime suicide attempts are more frequent in lesbians, 18% vs 8% in heterosexuals (RR = 2.25). 4. Seeking therapy is more frequent for lesbians in the past but current frequency is close.</td>
</tr>
<tr>
<td>[32]</td>
<td>1. Alcohol 2. Current psychological distress 3. Suicidal thoughts and suicide attempts, 12 months</td>
<td>Ad hoc questions Adaptation of the Psychiatric Symptom Index (PSI)</td>
<td>Stratified by sex</td>
<td>1. The percentage of current drinkers does not differ according to sexual orientation in men or women. Bisexuals are more numerous to have recently been drunk than the others. 2. Male homosexuals declare being in psychological distress more often than heterosexuals (29% vs 17%; RR = 1.7), but not the female homosexuals (21% vs 23%). Bisexuals present high psychological distress more often than homosexuals (36% for men and 41% for women). 3. Suicidal thoughts are more frequent in bisexuals, then in homosexuals, than in heterosexuals. Suicide attempts during the last 12 months are 4.2%, 1.2%, and 0.5%, respectively, both sexes combined.</td>
</tr>
<tr>
<td>[33]</td>
<td>1. Alcohol, illicit drugs 2. Depression, generalized anxiety, agoraphobia, panic attacks 3. Sought mental health care, 12 months</td>
<td>Composite International Diagnostic Interview Short Form (CIDI) Ad hoc questions</td>
<td>Stratified by sex Adjusted for age, ethnic origin, educational level, income</td>
<td>After adjustment: significant association between homosexual behavior and 1. Alcohol or drug dependence for women but not for men. 2. Mental health problems for men (adjusted OR = 2.3 [1.3–3.9]) and not for women (adOR = 1.6 [0.8–3.5]). 3. Seeking mental health and addiction care for both sexes (adOR = 3.1 [1.5–6.3] for men and adOR = 2.9 [1.3–6.7] for women).</td>
</tr>
<tr>
<td>[34]</td>
<td>1. Alcohol 2. Depression 3. Well-being and quality of life</td>
<td>Ad hoc questions CES-D short form: 9 items SF-36 items</td>
<td>Adjusted for age, center, ethnic origin, educational level, occupation, health insurance</td>
<td>After adjustment 1. More frequent and heavier alcohol consumption for lesbians and bisexuals than for other women. 2. More frequent depression for lesbians (16%) and bisexuals (15%) than for other women (11%). 3. Well-being and quality of life not different.</td>
</tr>
<tr>
<td>[35]</td>
<td>1. Alcohol, illicit drugs 2. Depression, anxiety, phobia, etc 3. Suicide ideation and attempts (12 months and lifetime)</td>
<td>CIDI</td>
<td>Stratified by sex Adjusted for age, education level, income, ethnic origin, marital status</td>
<td>After adjustment 1. Abuse and alcohol dependence not significantly different according to sexual orientation for both sexes. Drug abuse is more frequent for homosexuals and dependence in homosexual men. Female homosexuals begin to consume alcohol earlier in life. 2. Risks of depression (35% vs 14%) and anxiety (40% vs 22%) are higher for homosexual women than for heterosexuals, but not significantly for men (respectively, 12% vs 8% for depression and 15% vs 12% for anxiety). 3. Suicidal ideation is more frequent for homosexuals of both sexes. Suicide attempts, 12 months, are more frequent in male homosexuals (1.5% vs 0.6%), but not for females (0.6% vs 1.0%). The same is true for lifetime suicide attempts.</td>
</tr>
</tbody>
</table>
1. Self-esteem
   Rosenberg self-esteem scale, 10 items
   Controlled variability by matching respondents to their sisters
   Pair analysis
   1. Better self-esteem score for lesbians than for heterosexuals
   2. No significant association for mental health
   3. More lifetime psychotherapies for lesbians

   Overall analysis of the sample
   1. No significant difference for self-esteem
   2. Poorer mental health on several BSI dimensions for bisexuals than for lesbians and heterosexuals, who have identical scores

2. Mental health
   (9 dimensions)
   Brief Symptom Inventory (BSI)
   Ad hoc questions

   1. Alcohol and illicit drugs (lifetime)
   2. Depression
   3. Anxiety

   CIDI
   Stratified by sex
   Adjusted for age, education level, rural/urban, stable partner or not
   After adjustment
   1. Homosexual women are more frequently dependent on alcohol and drugs.
   2. Mood disorders more frequent for homosexuals of both sexes: 49% vs 24% for women and 39% vs 13% for men
   3. Anxiety problems are more frequent for homosexual men (32% vs 13%) but not for women (26% vs 25%)

   1. Alcoholic women are more frequently dependent on alcohol and drugs.
   2. Mood disorders more frequent for homosexuals of both sexes: 49% vs 24% for women and 39% vs 13% for men
   3. Anxiety problems are more frequent for homosexual men (32% vs 13%) but not for women (26% vs 25%)

3. Psychotherapy (lifetime or current)
   Ad hoc questions

   1. Better self-esteem score for lesbians than for heterosexuals
   2. No significant association for mental health
   3. More lifetime psychotherapies for lesbians

   Overall analysis of the sample
   1. No significant difference for self-esteem
   2. Poorer mental health on several BSI dimensions for bisexuals than for lesbians and heterosexuals, who have identical scores
<table>
<thead>
<tr>
<th>Articles</th>
<th>Health problems studied and reference period</th>
<th>Mental health measurement tools</th>
<th>Context factors taken into account in analysis</th>
<th>Main results</th>
</tr>
</thead>
</table>
| [42]     | 1. Alcohol, illicit drugs  
2. Depression, anxiety, insomnia (1 week)  
3. Psychological distress  
4. Psychotherapies  
5. Self-destructive thoughts and behaviors | AUDIT, ad hoc questions  
CIS  
GHQ 12 items | Stratified by sex  
Successive adjustments (but not simultaneous) on demographic variables, health and lifestyle factors, verbal and physical violence | After adjustment  
1. Recreational drug use more frequent for homosexuals of both sexes; more alcohol consumption for homosexual women  
2. Significant association between homosexual orientation and poorer mental health for women (adOR = 1.50 [1.09–2.07]), as for men (adOR = 1.48 [1.09–2.01])  
3. More psychological distress for homosexuals than for heterosexuals  
4. More frequent consultations with mental health professionals for both homosexual men and women  
5. Self-destructive behaviors more frequent in lesbians (56%) and gays (54%) than in heterosexuals (50% for women and 41% for men). The results are similar for self-destructive thoughts |
| [43]     | 1. Alcohol or illicit drugs (1 year)  
2. Medical or psychological assistance (1 year)  
3. Depression (1 year)  
4. Self-mutilation (lifetime)  
5. Suicide: thoughts (1 year) and attempts (lifetime) | Ad hoc questions  
International Classification of Diseases 9th revision | Stratified by sex  
Adjusted for ethnic origin, education level, employment, socioeconomic status, cohabiting partner, children | 1. Men and women with same sex attraction consume more alcohol or other substances  
2. They also seek mental health professional help more frequently  
3. Depression is more frequent for men attracted by men (OR = 2.2 [1.2–4.3]), the difference is not significant for women (OR = 1.4 [0.9–2.3])  
4. Self-mutilation and suicidal thoughts are more frequent for men and women attracted by the same sex  
5. Suicide attempts are more frequent in men attracted by men (OR = 3.2 [1.4–7.2]), which was not found for women (OR = 1.4 [0.7–2.7]). For both sexes, a higher degree of attraction for the same sex is predictive of self-destructive behavior |
| [44]     | 1. Alcohol (current)  
2. Depression (current)  
3. Antidepressants (lifetime) | SF-36 | Adjusted for age, ethnic origin, region of residence | After adjustment  
1. Alcohol consumption is higher in lesbians, particularly in bisexuals, than in heterosexuals  
2. Depression is more frequent in bisexuals (22%), then in lesbians (18%) than in heterosexuals (13%)  
3. Antidepressant consumption is more frequent in lesbians (22%) and bisexuals (20%) than in heterosexuals (11%) |
| [45]     | 1. Psychological distress  
2. Self-esteem  
3. Psychotherapy, psychiatric hospitalizations, and psychotropic drugs  
4. Self-injury  
5. Suicide: thoughts and attempts | BSI, GSI  
Rosenberg scale  
ad hoc questions | Adjusted for sex, age, education level | After adjustment  
1. 2. No difference between homo-/bisexuals and heterosexuals for psychological distress and self-esteem  
3. More history of psychotherapy and psychotropic drug consumption in lesbians, gays, and bisexuals  
4. More self-injury in these groups  
5. More suicidal thoughts and suicide attempts in lesbians, gays, and bisexuals, before and after 18 years of age. Suicide attempts after 18 years involve 10.5% of gays, 11.4% of bisexual men, and 3.3% of heterosexual men as well as 7.9% of lesbians, 10.7% of bisexual women, and 4.4% of heterosexual women  
More self-harm behavior in bisexuals (34% in men and 40% in women) than in gays (15%) and lesbians (24%) or than in heterosexuals, men (13%) or women (13%) |
1. Mental health
2. Depression (perceived, diagnosed, treated with medications)
3. Anxiety
4. Suicidal ideation (1 week) Self-harm or suicide attempts (6 months)

After adjustment

A. SF-36
B. CES-D
C. Ad hoc questions

adjusted for

A: age, education level, region of residence
B: stress, abuse, social support

1.2. 3. All women not exclusively heterosexual have poorer mental health and a higher depression and anxiety score. Among the young, 41% of homosexual women, 46% of bisexual women were depressed during the last 12 months vs 19% of exclusively heterosexual women
4. They had more suicidal thoughts and self-destructive behaviors. Among the young, 17% of homosexual women, 19% of bisexual women have attempted suicide during the last 6 months vs 3% of exclusively heterosexual women

1. Alcohol, illicit drugs
2. Psychological distress
3. Stress
4. Psychotherapies
5. Psychotropic drugs
6. Suicide attempts, (12 months and lifetime)

After adjustment

A: age, education level, place of residence, current partner, children
B: A + age at first sex, number of partners
C: A + B + physical or sexual violence, drug use

1. After adjustment A and B
2. Alcohol and drug consumption is higher for women who have had sex with women than for others, both during lifetime and the last 12 months
3., 4., 5. Psychological distress, stress level, mental health consultations, and psychotropic drug use are similar in both groups
6. After adjustment C, more women who have had sex with women have attempted suicide during lifetime (adOR = 2.2 [1.2–4.0])

1. Alcohol
2. Psychological distress

adjusted for

A: age, education level, current partner

1. Lesbians and bisexuals declare more often that they consume illicit drugs (IDU excluded); no difference for alcohol
2. They experience stress and anxiety more often in adolescence than heterosexuals, but not in adulthood
3. No significant difference in current depression between the three groups (11% of lesbians, 24% of bisexual women, and 18% of heterosexual women), but lesbians have been treated for depression more often than bisexuals or heterosexuals
4. Lesbians and bisexual women have had suicidal thoughts more often and made more suicide attempts, 17% in lesbians, 21% in bisexuals, and 10% in heterosexuals

1. Alcohol, illicit drugs
2. Stress and anxiety
3. Depression, treatment for depression
4. Suicidal thoughts (12 months), suicide attempts (lifetime)

After adjustment

1. Lesbians and bisexuals declare more often that they consume illicit drugs (IDU excluded); no difference for alcohol
2. They experience stress and anxiety more often in adolescence than heterosexuals, but not in adulthood
3. No significant difference in current depression between the three groups (11% of lesbians, 24% of bisexual women, and 18% of heterosexual women), but lesbians have been treated for depression more often than bisexuals or heterosexuals
4. Lesbians and bisexual women have had suicidal thoughts more often and made more suicide attempts, 17% in lesbians, 21% in bisexuals, and 10% in heterosexuals

1. Alcohol, illicit drugs
2. Depression (12 months)
3. Suicidal thoughts (12 months), suicide attempts (lifetime)

adjusted for

A: age, education level, current partner, and children

1. No significant difference in alcohol, cannabis, and other drug consumption in the last 12 months depending on sexual orientation
2. Homo-/bisexual men report more a depressive episode in the last year than heterosexual men (10% vs 4%); the similar trend for women is not significant (16% vs 9%)
3. Homo-/bisexual men had more often suicidal thoughts and suicide attempts than heterosexual men (10% vs 3% for suicide attempts); the difference in women was not significant (10% vs 6%)
bisexuality, even though these rates were slightly higher when self-definition was used rather than partners’ sex.

3.3. What are the main indicators of mental health? What measurement tools are used?

Excessive consumption and particularly dependence on alcohol or illicit drugs were among the indicators of mental health (Table 3). When these indicators were investigated, as in 15 of the articles studied, the authors did not always describe the instruments used to measure them. For the most part, ad hoc questions were used. The Alcohol Use Disorders Identification Test (AUDIT) was used in one of the studies [38] and the four-question DETA-CAGE in two others [48,51]. As for the use or dependence on drugs, no standardized measurement tool was used.

Most of the studies analyzed the frequency of symptoms of depression or anxiety, phobias, and panic attacks. Most often, the authors use validated instruments; certain were screening scales such as:

- the General Health Questionnaire (GHQ) with 12 or 28 items covering anxiety, depression, or current asociality [42,47,48];
- the Short Form (SF) 36, which measures general health and the ability to carry out activities of daily life in 36 items; this tool produces eight scales, four of which cover current mental health [34,44,46];
- the Psychiatric Symptom Index (PSI) with 14 items, which measures the symptoms of depression, anxiety, irritability, and cognitive problems over the last week [32];
- the Kessler Psychological Distress Scale (K10), which measures the state of distress over the last 4 weeks, with questions on symptoms of anxiety and depression [52];
- the Center for Epidemiologic Studies Depression Scale (CES-D), which measures depression in 20 items, stressing mood in the last week [34,46];
- the Brief Symptom Inventory (BSI), with 53 items, groups symptoms felt over the preceding week: depression, anxiety, phobia, hostility, etc. [36,45];
- the Goldberg scales, aiming to screen for current depression and anxiety, with nine items each, for a population consulting in general medicine [38].

Scales measuring quality of life or self-esteem, such as the 10-item Rosenberg scale, were used in certain surveys [36,45].

Others used instruments coming from clinical psychiatry such as:

- the Composite International Diagnostic Interview-Short Form (CIDI-SF) which queries the different aspects of mental problems (depression, anxiety, suicidal thoughts) over the preceding 12 months [33,35,37,40,49,51];
- the Clinical Interview Schedule (CIS) which queries the presence and severity of 14 nonpsychiatric symptoms during the preceding week: depression or anxiety problems, fatigue, memory loss, concentration problems,
Use of specialized mental health care was occasionally studied, questioning subjects on psychotherapy they may be following [31,33,36,40,42,43,45,47] or their consumption of psychotropic medications [39,44–47].

Suicidal thoughts or suicide attempts were analyzed in 12 articles. For suicide attempts, the reference periods vary: last 12 months [32,35,38,46,47], lifetime [31,35,39,43,47,49–51], or are defined in relation to age: before or after 18 years of age [45]. In addition, King et al. [42] studied current self-destructive behaviors.

3.4. Concordance and discordance of the main results on mental health

Nearly all of the studies investigating both sexes presented their results separately for men and women (Table 3). The question of the factors to take into account in the analysis is important because several aspects differ between homosexual and heterosexual individuals: on average, homosexuals had a higher level of education, were less likely to live with a partner, were less likely to have children, and were more likely to live in metropolitan areas. In the articles reviewed herein, the adjustment strategies varied, taking into account confounding factors: two articles did not consider any factor [31,32] and another one adopted a sampling strategy – pairs of sisters – aiming to control for the main differences [36]. Age was very often taken into account and to a lesser extent the level of education. More rarely, other factors were considered such as ethnic origin, life events, or abuse. The results commented below take adjustments into account (Table 3).

3.4.1. Alcohol and drug use

The majority of the surveys, whether or not based on a representative sample, showed a more frequent consumption or abuse of alcohol and drugs in homosexual or bisexual women than in their heterosexual counterparts. This result is generally not found for men for alcohol but is found for drug use. Only four articles, using different standardized measurement tools such as AUDIT and DETA-CAGE or based on ad hoc questions, described no difference in the consumption of or dependence on alcohol according to sexual orientation, for both sexes [38,40,50,51].

3.4.2. Depression and anxiety

Twenty articles presented results on depression, anxiety, or psychological distress, stress, and perceived mental health. These results varied greatly.

Six articles, for the most part on samples of women, did not observe a difference according to sexual orientation, in adulthood or in an earlier period of life, for symptoms of depression [31,36,41,45,47,50].

The other articles showed differences. Of the studies investigating only women, three articles described less favorable mental health for both depression and anxiety in nonheterosexuals. [34,44,46]; some emphasized the higher scores for depression and anxiety in bisexual women [44]. Of the studies including men and women, four reported poorer mental health in homosexuals for both men and women [37,38,42,52]. Five reported overall significant differences for men but not for women, with variations depending on the symptoms considered [32,33,40,43,51], and a single study observed differences on depression and anxiety problems for women but not for men [35].

The studies that found no difference in depression or anxiety according to sexual orientation were for the most part studies that recruited homosexuals in the community. Studies based on a representative sample all found a difference, except two [41,47], which focused more directly on depressive symptoms.

3.4.4. Suicide attempts

Of the 12 articles studying suicide attempts, most observed that they were more frequent in nonheterosexuals than in heterosexuals [31,32,38,39,45–47,50]. Four articles showed that suicide attempts were more frequent in homosexual men than women [35,43,49,51].

4. Discussion

This review of the literature reports on studies on mental health in relation to sexual orientation, published in the vast majority in English, over the last 15 years. To be included in this review, the studies had to conform to certain methodological requirements: they had to include a comparison group – heterosexual subjects – recruited in the same conditions as the study group – homosexuals – for whom the authors had the same mental health data. The use of general population surveys in this review allowed us to better characterize the relative frequencies of mental health problems in the two groups and to reduce the risk of bias found in the community-based surveys, which has been reported in other literature reviews [15,17,21,22]. In addition, the studies based on a “community” sample contributed more in-depth data from larger samples of homosexuals that general-population studies do not often cover well [56].

All the articles analyzed reported possible biases related to the variability of the definitions of sexual orientation. In the 2000s, the question of self-identification became the predominant criterion used to define groups. This is particularly the case in the surveys from English-speaking countries; the French and Dutch surveys used only the sex-of-partner...
criterion. Before the Contexte de la sexualité in France, not included in this review [57], the question of self-identification had never been posed in a general-population survey in France.

Since the 1990s, all the studies on targeted samples have used self-definition as a measure of sexual orientation, except for two studies [31,39], which used a combination of attraction and behavior. It seems likely that the introduction of questions on self-definition in general-population surveys was based on these community surveys, defining homosexuality in terms of how the individuals concerned identify themselves. Moreover, identifying oneself as gay or lesbian indicates an acceptance, even a pride in a stigmatizing designation, as part of a group, whether or not one goes to homosexual gatherings.

Nevertheless, despite the lack of homogeneity of the indicators used to define sexual orientation, there is at minimum a consensus on the three main dimensions of sexual orientation: attraction, behaviors, and self-identification [53,54]. The “choice” of including one dimension or another in the questionnaire, for general population studies, is less a well-debated theoretical decision than a compromise on the length of the questionnaire, its relevance in terms of the theme studied, the assumptions about the acceptance of certain questions by the interviewees or even the funders of the study. When all the indicators are available in the questionnaire, the use of one or another for publication of the results often depends on the numbers of people concerned. When the sample size is not very large, homosexuals and bisexuals are often grouped, whether they are constructed as a group based on their sexual behavior or on self-definition. All of these restrictions, technical, intellectual, and political, make it difficult to bring about true consensus on this question. Nevertheless, it seems that at a minimum, two distinct measures of sexual orientation are necessary, one behavioral and the other identity-based, to better evaluate the impact, possibly different, of each one on health [58–60].

The results on the relation between sexual orientation and mental health problems vary. Generally speaking, they do not seem to differ according to the type of instrument used to evaluate mental health, to define groups along sexual orientation, or according to country. However, the type of sample seems to influence the results: studies in the homosexual community with a control group reported fewer differences between homosexuals/bisexuals and heterosexuals. This may mean that these studies recruited individuals who are more expressive and more integrated into homosexual social networks, thus selecting persons in better psychological health.

It should be emphasized that when a difference was found, by and large in the general population studies, the results were more clear-cut for men than for women: more frequent episodes of depression or psychological distress for nonheterosexuals.

The results are much more consistent for attempted suicide, the risk of which was higher for homosexual men and women. All the studies show that this excess risk is significant for men, and three quarter of them reported the same for women. It may be that since women in general are at greater risk than men of suicidal thoughts or attempted suicide, the differences according to sexual orientation would be less visible for women. However, it must be remembered that suicide mortality is higher in men [61], and the paucity of studies on successful suicides according to sexual orientation preclude any definitive conclusion on this question.

The authors of the studies analyzed herein only partially explain the differences in mental health. Some emphasized the fact that the vast majority of homosexuals and bisexuals had no particular mental health problems [33], thus breaking with the old tradition of blaming homosexuality on psychiatric problems. A single article suggests possible biological causes and the atypical level of prenatal androgens depending on sex [37]. In an attempt to understand the increased risk observed, the same hypotheses are advanced: discrimination, stigmatization, and absence of social support. It is likely that the social hostility that most homosexuals experience is, at least in part, one reason for their higher levels of psychological problems. Several authors suggest the notion of “minority stress” proposed by Meyer [62]. Certain minority groups must deal with chronic stress factors resulting from their underprivileged status in society [63]. Homosexuals can be confronted with family rejection, which does not strike other minorities, such as those based on skin color, which is generally shared with family members.

Homosexual and bisexual individuals, less invested in the social institutions of heterosexuality, often have lifestyles that differ from those of heterosexuals: more numerous sexual partners [32,47,48,64] and shorter or more unstable relationships with partners [36,38,42,50], with the ruptures and problems that this implies, as well as more frequent alcohol and drug use [32–34,37,42,44,47,48]. It is possible that these more marginal lifestyles expose them to psychological distress. Moreover, certain studies have shown that the risk of having been subjected to abuse or harassment is more frequent in nonheterosexual individuals, particularly women [21,31,39,42,47,65].

Finally, a sociological and methodological aspect should be brought up, in that certain respondents may be more open than others in declaring information that generally remains undeclared; thus these respondents might be more willing to declare both homosexual behaviors and suicide attempts or symptoms of depression [43].

It is difficult to clearly situate bisexuals, because generally they are few in number and are included in the same group as homosexuals. However, 11 articles distinguished them when presenting their results [32,34,37,38,41,44–46,48,50,52]; eight show that mental health, whether measured in terms of psychological distress, anxiety, or suicide attempts, is not as good for bisexual individuals as for homosexuals, a result found for both men and women. Some authors underscore that one’s sexual orientation being neither heterosexual nor clearly homosexual is an important source of stress, in addition to the social pressures related to a minority sexual orientation [38]. Those defining themselves as bisexual may be subjected to a double discrimination on the part of the homosexual community and the society in general [36,58]. It is therefore possible that these individuals are even quieter about their sexual orientation; yet the research has shown a relation between not being open about one’s sexual choice and poorer mental health [50].
In conclusion, this review shows a relatively coherent picture of poorer mental health for homo- and bisexuals, with studies especially consistent for attempted suicide. Nonetheless, as underscored by several authors, the tendency to deduce from a higher rate of psychological distress in homo- and bisexuals that homosexuality may be a mental disease has not entirely disappeared [22,62]. Later studies should investigate the risk factors as well as protections against mental health problems in homo-/bisexual population: experiences of discrimination, the role of social support, coming out, etc. How these risks vary depending on sex, gender (whether or not one challenges the socially prescribed roles attributed to each sex, conforms in terms of self-definition and self-presentation, assumed to be different for men and women [66]), as well as according to age (in terms of personal changes over time and the historical moment), ethnic origin, or socioeconomic conditions is a vital aspect in understanding the relation between sexual orientation and mental health. It is important that large population health surveys include measures of sexual orientation, particularly in France where this type of information is, to say the least, incomplete. This kind of data should allow for more detailed study of health questions in various groups and different lifestyles and thus implement adapted public health policies.

5. French version

A French version of this article is available at doi: 10.1016/j.respe.2009.07.068.

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