



**Utrecht University**

**A systematic review examining risk factors for depression in sexual and gender minority subgroups: Lesbian, Gay and Bisexual sub-group analysis.**

Social Policy and Public Health: MSc Thesis

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## **Abstract**

Depression rates among lesbian, gay and bisexual (LGB) people are higher than in cisgender heterosexuals. Despite the need for targeted research that can be translated into specific interventions, these discrete sexual minorities are often grouped together. By not distinguishing, subgroup differences regarding the risk factors contributing to depression are obscured, and resources are not optimally focused to subgroup distinctions. This systematic review challenges this tradition by separating out data on lesbian, gay and bisexual men and women in relation to risk factors for depression. An extensive search across PubMed, Scopus, and PsycINFO was conducted by two reviewers. Findings from 39 papers suggest that LGB populations share several minority stress related risk factors and that the most researched risk factors, and the risk factors with the strongest association for depression, fall consistently within the minority stress framework (Meyer, 2003). For lesbians, an absence of self-esteem was most associated with depression. For gay men internalised homophobia and for bisexual women bi-negativity was most associated with depression. While coming-out/disclosure of sexual identity was most associated with depression for bisexual men. The data does contain a number of inconsistencies, with over half of the 39 included studies including gay men (69.2%) and the least including bisexual men (25.64%). Data lacked reporting on race/ethnicity across contexts and most studies received mid/low-quality ratings, based on The Newcastle - Ottawa Quality Assessment Scale evaluation from two reviewers, due to a reliance on convenience sampling strategies and a lack of controls. Overall, this review provides a breakdown of risk factors for depression in LGB sub-populations and further urges researchers to follow this approach in the future to uncover both research bias and the unique ways in which minority stress, and other risk factors, may affect the mental health needs of sexual minority subgroups.

**Words: 295**

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## Introduction

### Problem statement

Depression rates, among the lesbian, gay and bisexual (LGB) community are higher than CIS-gender heterosexuals (Cochran & Mays, 2006; Gilman et al., 2001; King et al., 2008; P. Lewis et al., 2006). Across contexts and drawing on population based, quantitative, and qualitative studies it would not be an overstatement to declare that the LGB community are experiencing a crisis of mental ill health (Fergusson et al., 1999; Gilman et al., 2001).

Considering mental disorder, suicide, and deliberate self-harm in lesbian, gay and bisexual people, King et al. (2008) reported that the risk of 12 months prevalence of depression in LGB people, reviewing meta-analysis data, was at least twice that of heterosexual controls with little heterogeneity.

Symptoms of depression, such as long-term low mood, affect a person's ability to function in everyday settings such as at work, school or with friends and family and depressive episodes, that characterise depression, can be described as mild, moderate, or severe (WHO, 2019). Despite its severity, depression, at its core, remains an extremely personal, unsettling, and complex weight individuals carry with them that interrupts their constructive and joyful lives (Steger & Kashdan, 2009). In some cases, depression can even lead to suicide (WHO, 2019) with suicidal ideation being over five times more likely in LGB young adults (Almeida et al., 2009) and the LGB population being five times more likely to report a previous suicide attempt (Hatzenbuehler, 2011). Additionally, the impact depression has on individual functionality has led it to become a major contributor to the overall global burden of disease and contribute towards it being considered the leading cause of disability worldwide (WHO, 2019). From an economic perspective, it is estimated that depression costs the global economy ~\$1 trillion every year in lost productivity (WHO, 2019).

Despite the impact of depression being detrimental personally, socially, and economically, the risk factors that LGB experience, that contribute to a clinical diagnosis, depressive symptomology, or depression tendencies, have seldom been researched considering the differences in experiences between lesbian, gay and bisexual individuals (Plöderl & Tremblay, 2015). Persons who identify as lesbian, gay men or bisexual men and women encounter different situations with varying effect, not only due to their sexual and gender

identity, but due to other identity features, such as age or ethnicity. In previous reviews, researchers have often been compliant in grouping the different sexual and gender minorities together, either to increase statistical power or, in older studies, due to a lack of understanding of the nuances between the groups (Plöderl & Tremblay, 2015). By lumping together LGB and assuming the risk factors for depression are universal across the gender and sexual identity spectrum, the economy and society, the overall LBG community wellbeing, and the individuals experiencing the weight of depression are put at an increased risk due to a lack of specialised interventions.

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## Existing patterns in LGB mental health research

An evident existing pattern in sexual minority research is a commitment to banding together participants under acronyms, such as LGB. The grouping together of LGB mental health data has long made sense in both academia and advocacy. The structural barriers, social stigma, and personal battles of identity experienced by LGB individuals are all within the same vacuum of heteronormativity (Meyer, 1995) and can therefore be advocated for using similar tactics and rhetoric. Looking inwardly and considering how LGB individuals self-identify, Bardwell (2019) interviewed LGBTQ members to examine how they defined their community. Participants reported four common themes that transcend their differences, including (1) the need for support; (2) common or shared visions and goals; (3) shared physical spaces; and (4) LGBTQ-specific events. Therefore, grouping together LGB, by the community itself, is mainly on the grounds of support, similarities, safety, and spaces.

However, Plöderl & Tremblay (2015) argue that the grouping together of LGB data in academia is based less on a respectful understanding of the inclusive definitions given by the community, and more for practicalities. By clustering together LGB, it is easier to draw strong association based on statistical power in comparison to heterosexuals (Plöderl & Tremblay, 2015). Sampling techniques, until the 1990s, were likely to produce bias, due to sampling sexual and gender minorities within the general population, as opposed to LGB communities (Kuyper, 2015). However, to associate grouping together the different divisions with the sole aim of being academically efficient would also be to oversimplify the tendency.

Ignorance of the different nuances between the sexual and gender identities in academia has been well reported, for example in relation to bisexuality. In their systematic review and meta-analysis on the prevalence of depression and anxiety among bisexual people, Ross et al. (2018) explain how the bisexual community have been omitted from research due to a lack of understanding of how bisexuality differs from heterosexuality and homosexuality. Previously, bisexuals were classified as either lesbian or gay or heterosexual depending on the gender/sex of their current partner, therefore ignoring their sexual identity and the additional risk factors this potentially brings (Ulrich, 2019). Bisexuals have higher levels of

mental health problems than homosexual individuals (Marshall et al., 2011, 2013); without bisexual specific data the differences in prevalence would be lost.

The need for divided data was further highlighted by findings from a recent Trevor Project-commissioned survey into LGBTQ+ opinions on barriers to quality mental health care (Green et al., 2020). The report found that “one in three transgender and non-binary youth stated that they didn’t receive desired mental health care because they didn’t feel a provider would understand their sexual orientation or gender identity” (Green et al., 2020). As this feedback from the community highlights, the unique lived experience of transgender and non-binary individuals, as members of the LGBT umbrella, needs to be translated into specialised mental health care that varies both from that of the heterosexual community and their LGB counterparts.

However, the lack of LGB separated data is not the only concern with existing data on sexual minority risk factors for depression. In general, the data is heavily weighted towards youth and focuses on age-related stressors, such as the heteronormativity of the education system, leaving out middle-aged and older LGB members (Almeida et al., 2009). In their systematic review of qualitative data concerning LGBTQI+ youth and mental health, Wilson & Cariola (2020) sampled 34 relevant articles to find that the inability to disclose sexual or gender orientation, the fear of “coming out”, and the subsequent negative experiences following disclosure were strong predictors of depression and suicidality for LGBTQI+ youth (Jones & Hillier, 2013; McDermott et al., 2018). Additionally, homophobic and bi-phobic bullying and victimisation by fellow students was found to be a key risk factor in the mental wellbeing of LGB youth (Wilson & Cariola, 2020). There is a gap in knowledge regarding older LGB adults’ risk factors for depression. However, Fredriksen-Goldsen et al.’s (2014) study into LGBT quality of life, stratified by age group, identified lifetime victimisation, internalised stigma, lack of health care access, obesity, and limited physical activity as risk factors for health universal for the LGB older population.

Despite the importance of taking an intersectional approach due to the multifaceted make-up of the LGB population, existing research reports that the available data on prevalence, experiences, and risk factors specific in LGB People of Colour (LGB POC) are limited. Despite being subject to discrimination and stigma related to both their sexuality and race, resulting in compounding stressors (Cochran et al., 2007), the available literature does not present a

collective understanding of how, or conclusively if, this results in higher rates of psychological distress than white LGB people (Roberts & Christens, 2020). However, despite limited reference, it is difficult to deny the additional stressors and pressure on LGB POC existing in systems upheld by both racism and homophobia (Meyer, 1995).

Considering the role systems play in upholding prejudice, in many situations, LGB individuals are battling against local and national systems that limit even basic human rights and prohibit happiness and wellbeing by virtue of legalised discrimination in the form of constitutionalised homophobia. For example, same-sex marriage is legal in only 28 UN Member States with 67 States criminalising even consensual same-sex conduct. In six states same-sex conduct is even punishable by death (Ramón Mendos, et al., 2020). At least 42 UN Member States currently support and uphold legal barriers for freedom of expression on issues related to sexual and gender diversity (Ramón Mendos, et al., 2020). The impact of legislated repression upon wellbeing varies across lesbian, gay, and bisexual communities, dependant on visibility, tolerability, and acceptance of the different sexual and gender minorities.

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## Theoretical understanding

Understanding how and which factors shape outcomes is critical in research and ultimately in ensuring appropriate and effective interventions. Therefore, theory is key in identifying risk factors that may be of influence. When considering risk factors for sexual minority depression, there are three essential theories in this domain. Firstly, from a psychological perspective, the Minority Stress Theory (MST), provides a foundational understanding of the unique stressors put on the LGB population and aims to directly explain mental health outcomes. Meyer (1995) conceives that exposure to distal stressors, such as rejection and discrimination, has a direct impact on an individual's chance of experiencing proximal stressors, such as self-stigmatisation and vigilance, which compound to result in negative health outcomes, such as depression. The Meyer (2003) minority stress model documents the way individuals navigate between the stress processes, including prejudice and internalised homophobia, and ameliorative coping processes, such as incorporating cognitive or behavioural adjustments, which together effect health outcomes. Assessing the impact of a hostile marginalising environment, pressure to adapt, from minority related stress such as discrimination, are put on the sexual minority individual, this process, Meyer (2003) suggests, has a direct effect on mental health outcomes.

Overlapping with MST, The Psychological Mediation Framework (PMF), developed by Hatzenbuehler (2009), focuses on proximal stressors, particularly the role of stress and stigma in emotion dysregulation, social/interpersonal problems, and cognitive processes resulting in risk of psychopathology. Similarly to MST, PMF notes the pathway in which stress, as the catalyst, can lead to negative mental health outcomes. Hatzenbuehler (2009) also distinguishes between mediators (caused by the stressor) and moderators (evident prior to the stress) interact with minority existence. A notion in which MST and PMF differ in pathway but converge in outcome, is the conceptualisation of coping. MST poses the relationship between minority-stress and psychopathology as one of moderation, while PMF as a one of mediation (Pitoňák, 2017). However, conclusively both theories agree on the impact of coping and its ultimate effect on mental health outcomes. While on the distal level, the final theory that will guide identification of factors, The Fundamental Cause Theory (FCT) (Link & Phelan, 2010), locates the influence of stigma in the broader perspective of social determinants of health. The FCT relays how socioeconomic status



effects health disparities, and how, relating back to proximal stressors, prestige, the opposite of stigma, along with knowledge, power and connections, ensure those with lower status, such as stigmatised sexual minorities, have less access to health, resulting in increased chances of ill health.

MST, FCT and PMF confirm that being a member of the LGB community, within itself, is a risk factor for depression (Hatzenbuehler, 2011; Meyer, 1995; Schwartz et al., 2016; Link & Phelan, 2010). Empirical research, committed to a variety of methodologies, contexts and geographies uphold this connection (Hatchel, et al., 2018). Common minority stress related risk factors include stigmatisation, structural prejudice, victimisation (such as sexual victimisation, peer victimisation and intimate partner violence), discrimination and internalised homophobia – these experiences and exposures are created and intensified by the heteronormative structure of society (Hatchel, et al., 2019; R. J. Lewis et al., 2003; Toomey & Russell, 2016). Minority stress variables are key in understanding how favouring and rewarding heteronormativity can impact on LGB mental health (Meyer, 1995). The PMF affirms that minority stress is associated with changes in cognitive, affective, and social psychological processes, thereby leading to negative mental health outcomes (Schwartz et al., 2016). The personal trajectory of any given member of the LGB community “at the centre of this experience is the incongruence between the minority person's culture, needs, and experience, and societal structures” (Meyer, 1995: 39). The FCT poses that because of power structures and unequal resources and access, members of higher-status groups (such as heterosexuals) experience better health, including mental health, than members of lower-status groups (such as LGB), because of their disproportionate admittance to health-protective factors (Bränström et al., 2016).

Stigma, the negative association of an attitude, behaviour, or reputation, has detrimental effects on the wellbeing of specific identities, such as LGB (Goffman, 1963). The FCT positions stigma, along with connected discrimination and access disparities, as an additional risk factor LGB must face when trying to access mental healthcare (Khan et al., 2017). The MST and PMF report that stigma effects the LGB community on a distal and proximal level (Pitoňák, 2017). On a proximal level, prejudice-induced events, including violence/victimisation and discrimination, are driven by stigma (Meyer, 2003) and have a negative impact on mental wellbeing. On a distal level, discrimination based on minority

status has been proven by many in the field to be associated with negative mental health in LGB (Hatzenbuehler, 2011). Crucially, on both levels the individual is negatively impacted due to their LGB status and put at risk of depression.

Furthermore on the proximal level, as the MSF and PMF suggest, self-stigmatisation (Thoits, 1985), which involves a process of incorporating negative societal views of homosexuality into the self-concept, has a detrimental effect on the mental wellbeing of LGB (Pitoňák, 2017). The risk factor of self-stigmatisation, as stated by Meyer (2003) can present itself in the form of feeling the need to conceal one's minority identity. Although sometimes perceived as a protective factor, studies into the mental health outcomes of such conduct suggest there are numerous ways in which concealment can lead to negative mental health outcomes, including hypervigilance, threat of discovery, and social isolation (Pachankis et al., 2008). Internalised homophobia can also lead to individuals expecting rejection based on their stigmatised sexual and gender identity effecting both physical and mental health outcomes (Hatzenbuehler et al., 2009).

Although the MST, PMF and FCT provide an introductory rationale as to why LGB are at a structural and individual disadvantage compared to their CIS-hetero counterparts and deliver a conceptual framework in which influence and factors can be mapped against, the theories do not then provide a detailed account as to how minority stress varies between each subgroup. There is an assumption, without evidence, that minority stress is equally distributed, and the impact felt with equivalent force resulting in the same risk for negative mental health outcomes.

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## Research question

Prevalence studies have shown that the LGB community experience depression at elevated rates compared to the heterosexual CIS-gender population (Cochran & Mays, 2006; Gilman et al., 2001; King et al., 2008; P. Lewis et al., 2006). The role sexual orientation plays in prevalence of depression is well documented, while a gap in research remains around how minority stressors are split according to LGB subgroup and how then these risk factors are associated with depression across subgroups. It would be oversimplistic to assume that gay men, lesbian women, and bisexual men and women experience minority stress, and other non-sexual identity related risk factors, the same. Therefore, it would be oversimplistic to assume the association to depression is the same. This systematic review aims to fill this gap in research and confirm the need for separated LGB data by answering the following research question:

- What risk factors have been assessed and found to be associated with depression in Lesbian women, Gay men and Bisexual men and women and to what extent are there differences between the subgroups, in which risk factors are assessed and found to be associated?

As the research question suggests, the current study can only evaluate the research that is available. Therefore, the current study will also make a concerted effort to report the quality, quantity, and funding origins of the available research across the subgroups with the aim of uncovering any potential research bias which might impact the validity of the findings.

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## Methods

### Search strategy

With the research question clear, an extensive search was conducted between 2021/04/27 –2021/05/13 for English language articles published between 2015/01/01 to 2020/12/31. The following electronic bibliographic databases were searched: PubMed, Scopus and PsycINFO. The search strategy was discussed with an expert at the University of Utrecht library to ensure the robustness of the search. The PEO (Population/Problem/Patient, Exposure, Outcome) system was used to guide the inclusion/exclusion criteria, as seen in Table 1.

In this review, the term ‘strength of association’ was operationalised to mean the weight of evidence in relation to a potential association. Therefore, the most documented risk factors per subgroup were reviewed with the aim of reporting if the association is positive, negative or if there is no association.

**Studies to be included:** Quantitative empirical studies with a cross-sectional, cohort, or case-control design that examined risk factors for depression in lesbian, gay or bisexual men and women were included. Findings had to include data on one or more specific sub-group. Findings could include more than one sub-group but must separate out the data according to sub-groups (e.g., bisexual men) and not present data across groups (e.g., LGB). For bisexuals, the data must be split by sex/gender<sup>1</sup>. Studies had to aim to show an association between a risk factor and depression using a given measurement. Studies that referred to depression as a mediator for a different outcome, such as suicide, were not included.

**Publications to be included:** Grey-literature such as dissertations or conference proceedings were not included. Commentary, reviews, editorials, or opinion pieces were also excluded. All included studies had to have open access as full-text articles, be peer-reviewed, and be published in the English language.

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<sup>1</sup> Note, sex/gender here is defined based on the definition of the authors of the study.

<b>PEO</b>	<b>Inclusion</b>	<b>Exclusion</b>
<b>(P)opulation</b>	<ul style="list-style-type: none"> <li>• Data must be specific to lesbian or gay or bisexual participants.</li> <li>• Bisexual data must be separated by gender/sex (as specified by author).</li> <li>• Studies must specifically focus on data from one group (e.g., lesbians) or collected from multiple (e.g., lesbians and bisexual women, but presented separately).</li> <li>• All age group data will be included.</li> <li>• Global data at country level will be included.</li> <li>• The study must include data from two or more cities to be included.</li> </ul>	<ul style="list-style-type: none"> <li>• Generalised data that groups minorities together, via acronyms (e.g., LGBTQI+ or LGB) will be excluded.</li> <li>• Studies specifying men who have sex with men (MSM) will be excluded as this term includes gay, bisexual men, and heterosexual sex-workers unless the data is separated out by gay men and bisexual men.</li> <li>• Studies specifying 'bi+' (individuals who date more than one gender e.g. bisexuals and pansexual) will be excluded.</li> <li>• Data from a specific city (e.g. New York) will be excluded due to risk factors being too specific to a given location.</li> <li>• Heterosexual results will not be collected as a control, as the data on heterosexual risk factors for depression are both readily available and will differ significantly due to factors outlined in the existing research and theory sections.</li> </ul>
<b>(E)xposure</b>	<ul style="list-style-type: none"> <li>• A risk factor must be associated with increased depression rates in a specific community to be included.</li> <li>• Any exposure/ experience/ attribute/ determinant that is positively associated with increased depression will be included.</li> <li>• Protective factors for depression, occurrences that are associated with a positive decrease in depression rates, will only be included if, in turn, they present a risk factor that results in an increase in depression.</li> </ul>	<ul style="list-style-type: none"> <li>• Risk factors documented without a statistical strength of association to the exposure of depression will be excluded.</li> </ul>
<b>(O)utcome</b>	<ul style="list-style-type: none"> <li>• The outcome from the identified risk factor(s) must be depression.</li> <li>• Depression can be defined as a formal diagnosis (such as Major Depressive Disorder: MDD) or</li> </ul>	<ul style="list-style-type: none"> <li>• Mention of other mental disorders as the outcome, such as bipolar or schizophrenia, will be excluded.</li> <li>• If depression is mentioned as a comorbidity or mediator to other disease associated with specific</li> </ul>

depressive symptomology or depressive behaviour.	risk factors, such as anxiety or outcomes such as suicide, it will be excluded. <ul style="list-style-type: none"> <li>• Postnatal depression will be excluded.</li> </ul>
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Table 1. PEO criteria and working definitions to guide study inclusion for this review

### Data extraction

The data extraction followed the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews) guidelines for identification and screening. The review team was made up of two core reviewers and a third reviewer who was contacted when agreements could not be settled between the core reviewers. First screening was conducted blind by both reviewers by reading the titles and abstracts of all the studies extracted from the three data bases against the predefined inclusion criteria in Table 1. Second screening involved a full text review of the studies. The full text articles were split between the core reviewers and any uncertainties shared with the third reviewer. Reviewer biased was therefore eliminated throughout the process, via cross-examination of studies.

### Data management

All papers were initially managed within Zotero<sup>2</sup> to remove duplicates. Then selected papers were inputted into Rayyan<sup>3</sup> for title and abstract screening. During the full text screening, reviewers entered information, including authors, title, publication year, country of study, setting, participants – mean age, gender, race, and sexual orientation – study design, risk factor(s), measurement method, statistical parameter of association and funding body, into an Excel spreadsheet, see appendix. Once the final papers had been selected for inclusion, The Newcastle - Ottawa Quality Assessment Scale (NOS) was used to document quality of biased assessment, within an Excel format, see appendix.

<sup>2</sup><https://www.zotero.org/>

<sup>3</sup><https://rayyan.qcri.org/welcome>

## Quality of bias

Methodologic quality was extracted and assessed using two versions of the Newcastle-Ottawa Risk of Bias Tool (NOS) for cohort studies and cross-sectional studies, presented in appendix. This was conducted to align with good practices, outlined in Cochrane's Handbook for Systematic Reviews of Interventions (2021), and to meet objective two; to provide an analysis of the differences in quality between the subgroup data on depression risk factors.

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## Results

778 articles were identified from PubMed, 1,540 articles were identified from Scopus and 832 articles were identified from PsycINFO, resulting in a total of 3150 articles.

1,369 duplicates were excluded using Zotero. From there, 1,781 study titles and abstracts were reviewed for relevance by both reviewers, of which 289 were identified for further full text screening. After screening the full text, 250 articles were removed, resulting in a final included article count of 39. Figure 1, the PRISMA flow-chart, describes how these articles were systematically identified, excluded, and selected throughout this process.

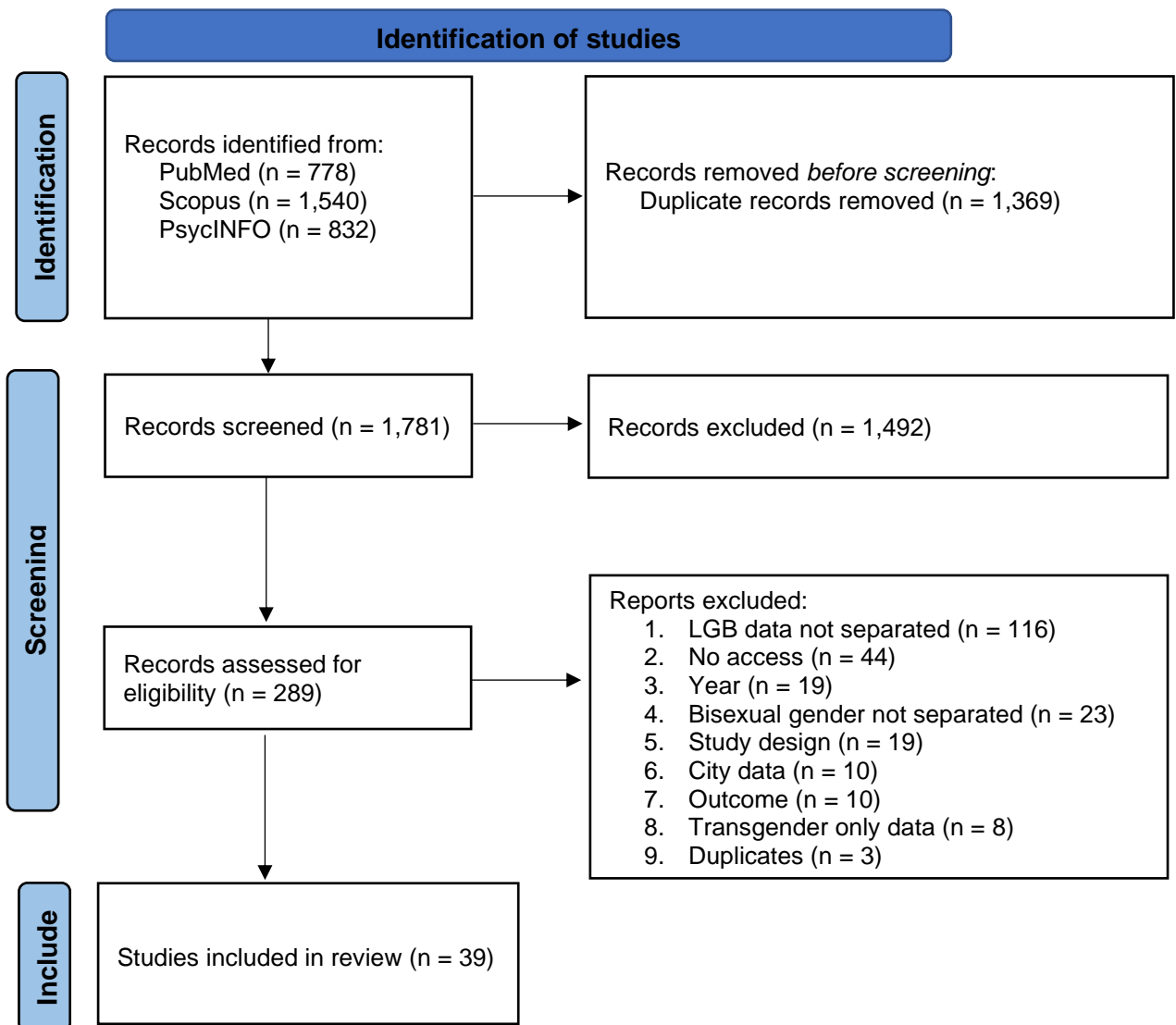


Figure 1—PRISMA flow chart: risk factors for depression in lesbian women, gay men, and bisexual men and women.



### Characteristics of the sample

General characteristics of the final sample of 39 included studies are presented in Table 2. The number assigned to studies in column “#” of Table 2. will be referred to in upcoming figures; the full reference list can be found in the appendix. Of the studies included in this systematic review, 14 (35.89%) were completed in the USA, 9 (23.07%) studies from Australia, followed by 5 from Israel (12.82%). The remaining geographical locations each provided 1 study: Brazil, Nigeria, South Korea, China, Spain, Taiwan, Canada, Chile, Vietnam, and Jamaica. Also included were an international collaboration study between Portugal and Spain.

Overall, a total of 347,891 participants were included in the studies with 9,116 gay men, 8101 lesbian women, 9,685 bisexual women, and 2,414 bisexual men. 126,912 heterosexual men and 190, 537 heterosexual women were also included in the studies. The remaining 1,126 participants were categorised under terms “bisexual/pansexual”, “other sexual identity”, “queer”, “unsure/questioning”, “straight/heterosexual [no gender given]”, “asexual”, and “mainly heterosexual women”.

The median sample size was 438 with a range of 309457 from 89 to 309546. Age ranged from 15 to 94 with seven studies specifying a youth sample with a mean age of below 25 and four studies specified older adults with a mean age of over 60. Most of the studies did not present ethnic representation in their samples with 53.84% not reporting race and 35.9% reporting ‘mostly white’ (60%+) participants, see appendix.

To measure the outcome of depression, 36 studies used a recognised measurement scale. Two of the remaining studies using binary measures of frequent mental distress and diagnosed depression and one study using a single yes/no question. Of the 36 scale studies, all were self-administered using a Likert/Likert-type scale. 26 (72.22%) used scales with over 20-items, with 17 of the 26 using the 20-item The Centre for Epidemiological Studies-Depression Scale (Radloff, 1977). The majority of the scales used, 83.33%, were developed before the year 2000, and are therefore over 20 years old.

Most studies, 89.7%, used cross-sectional data. The remaining 10.3% of studies used longitudinal data with varying lengths of two weeks, three weeks, seven years, and twenty years. Overall, the most common recruitment strategy was via social media (35%), such as

LGB Facebook pages or Craigslist. The second most common strategy was via secondary data (19%), with recruitment via snowball sampling, LGB organisations or LGB events each being used in 4 studies (11%): a full breakdown can be seen in the appendix. Overall, non-probability sampling, via quota, purposive, volunteer, or haphazard techniques, were used in all the studies that reported their sampling strategy. Despite being within scope of the inclusion criteria, no case-control studies were included in the final articles.

#	Author	Country	Sample	Participants	Outcome measure	Study design
1.	Aparicio-García (2019)	Spain	(n=668)	120 lesbians, 140 bisexual women, 407 heterosexual women	Cuestionario Tridimensional de Depresión // Three-Dimensional Depression Questionnaire	Cross-sectional
2.	Baams (2015)	United States	(n = 872)	268 gay men, 190 lesbians, 135 bisexual men, 279 bisexual women	Beck Depression Inventory - Youth	Cross-sectional
3.	Bahamonde s-Correa (2016)	Chile	(n=467)	268 gay men, 199 lesbian women	Anxiety-depression dimension from the Chilean standardized version of the Outcome Questionnaire	Cross-sectional
4.	Cain (2017)	United States	(n= 1125)	1071 gay men, 54 bisexual men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
5.	Davidson (2016)	Australia	(n=246)	246 gay men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
6.	Dyar (2018)	United States	(n=180)	180 bisexual women	7-item Center for Epidemiological Studies Depression Scale–Short Form	Longitudinal
7.	Fingerhut (2018)	United States	(n=89)	89 gay man	20-item The Centre for Epidemiological Studies-Depression Scale	Longitudinal
8.	Gonzales (2017)	United States	(n=308546)	2366 gay men, 1501 bisexual men, 125476 heterosexual men, 1718 lesbian women, 2705 bisexual women, 174780, heterosexual women	Binary measures of frequent mental distress and diagnosed depression	Cross-sectional
9.	Hanley (2015)	Australia	(n=162)	162 lesbian women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
10.	Kornblith (2015)	United States	(n=529)	276 lesbian women, 253 heterosexual women	10-item The Center for Epidemiological Studies Short Depression Scale Boston Version	Cross-sectional
11.	Lawrenz (2019)	Brazil	(n=100)	100 gay men	Depression Anxiety Stress Scale	Cross-sectional
12.	Lee (2019)	South Korea	(n= 2178)	851 gay men, 114 bisexual men, 582 lesbian women, 631 bisexual women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional

<b>13.</b>	Lo (2019)	China	(n=438)	438 lesbian women	Hospital Anxiety and Depression Scale	Cross-sectional
<b>14.</b>	Luk (2019)	United States	(n=2024)	21 gay men, 16 lesbian women, 85 bisexual women, 21 bisexual men, 778 heterosexual men, 1061 heterosexual women, 32 questioning	Patient-Reported Outcomes Measurement Information System	Longitudinal
<b>15.</b>	McLaren (2020a)	Australia	(n=270)	270 gay men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>16.</b>	McLaren (2020b)	Australia	(n=356)	169 gay men, 187 heterosexual men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>17.</b>	McLaren (2015)	Australia	(n=918)	360 gay men, 444 lesbian women, 114 bisexual women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>18.</b>	McLaren (2020c)	Australia	(n=306)	306 bisexual women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>19.</b>	Molina (2015)	United States	(n=470)	470 bisexual women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>20.</b>	Morris (2015)	Australia	(n=177)	177 gay men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>21.</b>	Nguyen (2016)	Vietnam	(n=1936)	1079 lesbian women, 557 bisexual women, 300 unsure	20-Vietnamese version 21 of the Patient Health Questionnaire	Cross-sectional
<b>22.</b>	Oginni (2018)	Nigeria	(n=162)	81 gay men, 81 heterosexual men	Zung Depression Scale	Cross-sectional
<b>23.</b>	Pereira (2020)	Portugal & Spain	(n=191)	114 gay men, 77 bisexual men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>24.</b>	Petterson (2017)	Canada	(n=598)	289 gay men, 69 lesbian women, 98 heterosexual men, 142 heterosexual women	Diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders	Cross-sectional
<b>25.</b>	Pharr (2019)	United States	(n=9016)	1239 lesbian women, 2180 bisexual women, 5597 heterosexual women	Binary measures of frequent mental distress and diagnosed depression	Cross-sectional
<b>26.</b>	Politt (2017)	United States	(n=383)	128 bisexual men, 255 bisexual women	Beck Depression Inventory - Youth	Cross-sectional
<b>27.</b>	Shenkman (2017)	Israel	(n=272)	152 gay men, 120 heterosexual men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>28.</b>	Shenkman (2019a)	Israel	(n=164)	82 gay men, 82 heterosexual men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>29.</b>	Shenkman (2016)	Israel	(n=219)	136 gay men, 83 lesbians	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>30.</b>	Shenkman (2018)	Israel	(n=692)	692 gay men	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional
<b>31.</b>	Shenkman (2019b)	Israel	(n=528)	142 gay men, 90 heterosexual men, 82 lesbian women, 214 heterosexual women	20-item The Centre for Epidemiological Studies-Depression Scale	Cross-sectional

32.	Slimowicz (2020)	Australia	(n=147)	147 gay men	The DSM-oriented depression subscale of the Achenbach Self Report form	Cross-sectional
33.	Smalley (2015)	United States	(n=2500)	710 gay men, 945 lesbian women, 690 bisexual women, 155 bisexual men	The Depression Anxiety Stress Scale	Cross-sectional
34.	Starks (2017)	United States	(n=256)	256 gay men	Brief Symptom Inventory	Cross-sectional
35.	Szalacha (2017)	Australia	(n=8850)	8083 heterosexual women, 568 mainly heterosexual women, 100 bisexual women, 99 lesbian women	10-item The Center for Epidemiologic Studies Depression Scale	Longitudinal
36.	Taliaferro (2017)	United States	(n=912)	734 bisexual women, 178 bisexual men	Depressive symptoms	Cross-sectional
37.	Wang (2020)	Taiwan	(n=581)	322 lesbian women, 259 bisexual women	10-item Center for Epidemiology Studies Depression Scale	Cross-sectional
38.	White (2016)	Jamaica	(n=110)	59 gay men, 51 bisexual men	The Zung scale	Cross-sectional
39.	Whitton (2020)	United States	(n=273)	38 lesbian women, 134 bisexual/pansexual, 50 other sexual identity, 30 queer, 9 unsure/questioning, 1 straight/heterosexual, 2 asexual, 9 not listed	The Patient-Reported Outcomes Measurement	Cross-sectional

Table 2. Overview of the included studies included in: *A systematic review examining risk factors for depression in sexual and gender minority subgroups: Lesbian, Gay and Bisexual sub-group analysis* (n =347,891).

### Quality of bias

All included studies were assessed for their risk of bias using the NOS tool for cohort or cross-sectional studies as shown in Tables 3. For the 35 cross-sectional studies, the average score for selection was 1.35 out of 3, for comparability 1.02 out of 2 and 1.25 out of 2 for outcome/exposure. Overall, the average was 3.62 out of 7 stars. For the four longitudinal studies, the average score for selection was 2.75 out of 4, for comparability 1.25 out of 2 and 2.25 out of 3 for outcome/exposure. Overall, the average was 6.25 out of 8 stars.

#	Author	Selection	Comparability	Outcome/exposure
<b>Cross-sectional</b>				
1.	Aparicio-García (2019)	*	-	*
2.	Baams (2015)	*	*	*
3.	Bahamondes-Correa (2016)	*	-	**
4.	Cain (2017)	*	-	*
5.	Davidson (2016)	**	-	**
8.	Gonzales (2017)	**	**	**
9.	Hanley (2015)	*	-	*
10.	Kornblith (2015)	*	*	**
11.	Lawrenz (2019)	*	-	*
12.	Lee (2019)	**	-	**
13.	Lo (2019)	*	*	*
15.	McLaren (2020) (1)	**	**	**
16.	McLaren (2020) (2)	**	**	**
17.	McLaren (2015)	**	**	*
18.	McLaren (2020) (3)	**	**	**
19.	Molina (2015)	**	-	**
20.	Morris (2015)	*	**	*
21.	Nguyen (2016)	*	**	**
22.	Oginni (2018)	*	*	*
23.	Pereira (2020)	*	-	*
24.	Petterson (2017)	**	*	*
25.	Pharr (2019)	*	*	**
26.	Politt (2017)	**	**	*
27.	Shenkman (2017)	*	**	**
28.	Shenkman (2019a)	**	**	*
29.	Shenkman (2016)	*	*	*
30.	Shenkman (2018)	*	**	*
31.	Shenkman (2019b)	***	**	*
32.	Slimowicz (2020)	*	**	**
33.	Smalley (2015)	*	*	*
34.	Starks (2017)	**	-	*
36.	Taliaferro (2017)	**	*	-
37.	Wang (2020)	*	-	**
38.	White (2016)	*	-	*
39.	Whitton (2020)	***	**	**
<b>Cohort studies</b>				
4.	Fingerhut (2018)	*	-	**
6.	Dyar (2018)	**	*	**
14.	Luk (2019)	****	**	**
35.	Szalacha (2017)	****	**	***

Table 3. Quality assessments (NOS Risk of Bias' tool for cross-sectional studies and cohort).

## Sub-group results

### Studies with Gay Men

As seen below in Figure 2, gay men had the highest number of focused studies. Eight studies only recruiting gay participants and a further four more only recruited gay participants with heterosexual men as a control population. 15 studies also included gay data stratified with bisexual men, lesbian women, and combination data, resulting in 27 studies. The most frequently studied risk factors for depression among gay men were internalised homophobia, sense of belonging, and neuroticism (via The Big Five Inventory); see appendix for all risk factors recorded.

Five studies (Bahamondes-Correa, 2016; Cain et al., 2017; Davidson et al., 2016; Lee et al., 2019; McLaren, 2015) aimed to show a link between internalised homophobia/homonegativity and depression in gay men. All studies used The Internalised Homophobia Scale (Wagner, 1998) with four studies (Bahamondes-Correa, 2016; Cain et al., 2017; Davidson et al., 2016; McLaren, 2015) presenting a positive association to depression. Results from Davidson, et al. (2016) showed that a sense of belonging to gay community, gay organisations, gay friendships, and the general community can moderate the relationship between internalised homonegativity and depressive symptoms. Therefore, internalised homonegativity and depressive symptoms were not significant when sense of belonging to the three levels of gay community and general community were introduced, demonstrating the strength of the sense of the belonging as a protective factor, or risk factor when absent (Davidson et al., 2016; Whitton et al., 2020).

This association was consistent in the studies that used the Psychological Subscale of the Sense of Belonging Instrument (Cain et al., 2017; Davidson et al., 2016) to measure sense of belonging and its ability to impact depression directly or moderate the impact of risk factors, such as living alone (McLaren, 2020a, 2020b) and internalised homophobia (Cain et al., 2017; Davidson et al., 2016), on depression in gay men. However, in Baams et al. (2015), the only study that used the Thwarted Belongingness Scale, results showed no significant moderation to depression, in the data on gay men, lesbians or bisexual men and women.

### Studies with Lesbian Women

As seen in Figure 2., two studies collected only lesbian data with a further one study recruiting only lesbian participants and a control of heterosexual women. 15 studies also included lesbian data stratified with gay men, bisexual women, or combination data, resulting in 18 studies. The most frequently studied risk factors for depression among the lesbian population were social support, self-esteem, and internalised homophobia.

Social support (Kornblith et al., 2015; Wang et al., 2020) was proven as significant protective factor against depression in lesbian women. Social support, when received in the form of relationship status, from family, and from friends was documented to be significant in moderating depressive symptoms (Hanley & McLaren, 2015). Further, relationship status and its affiliation to social support, was significant in predicting depressive symptoms with single lesbians being at an increased risk of depression (Kornblith et al., 2016; Lo et al., 2019; Whitton et al., 2020).

As reviewed by Lo et al. (2019), feminine presenting lesbians were at a significant increased risk of depression, compared to androgynous or masculine presenting lesbians, as femininity is associated with lower levels of self-esteem, which is significantly associated with higher levels of depressive symptoms across studies (Aparicio-García & Nieto, 2019; Lo et al., 2019; Whitton et al., 2020).

Unlike in the data on gay men, internalised homophobia showed a less clear association to depression in lesbian women with only one study (Wang et al., 2020) presenting a positive association, one study presenting no association (Bahamondes-Correa, 2016) and one study (Lee et al., 2019) being unclear in its findings. No conclusive decision can be more based on the included data between internalised homophobia and depression in lesbian women.

### Studies with Bisexual Women

Three studies, as seen in Figure 2., included data only on bisexual women with 13 studies including bisexual women data stratified with lesbians, bisexual men and combination data resulting in 16 studies. The most frequently studied risk factors for depression were negative health behaviours, internalised bi-negativity, and internalised homophobia.

Most of the studies (Gonzales & Henning-Smith, 2017; McLaren, 2015; Nguyen et al., 2016) reviewing negative health related behaviours (operationalised as smoking and binge-drinking) did not present data able to be inferred. The one study that did provide conclusive results presented a positive association between binge-drinking and depression (Molina et al., 2015).

Internalised bi-negativity was only measured in studies with bisexual women (Dyar & London, 2018; Molina et al., 2015). Studies unanimously presented a significant relationship between the indirect effect of increased internalised bi-negativity and increased depression. Demographic factors were noted to mediating internalised bi-negativity with post-hoc comparisons finding that African American participants exhibited more internalised bi-negativity relative to white participants and education significantly correlating with internalised bi-negativity and depressive symptoms (Molina et al., 2015).

Similarly, internalised homophobia in bisexual women was documented in three combination studies with inconsistent results (Lee et al., 2019; McLaren, 2015; Wang et al., 2020). McLaren (2015) presented that levels of internalised homophobia were unrelated to levels of depressive symptoms. In Lee et al. (2019) 44.1% of Chinese bisexual women reported high internalised homophobia with 59.4%, the highest percentage compared to their LGB counterparts, reporting depressive symptomology, however this association was not clearly tested. Whereas in a South Korean population a small but significant positive correlation was observed between depressive symptoms and internalised homophobia ( $r = 0.132$ ,  $p = .001$ ) (Wang et al., 2020).

### Studies with Bisexual Men

No studies included in the review only involved bisexual men. 10 studies included bisexual men stratified with gay men, bisexual women, or combination data, as seen in Figure 2. The most frequently studied risk factors for depression were coming out/disclosure of sexual identity stress, negative health behaviour, and social support.

Three studies (Baams et al., 2015; Politt et al., 2017; White et al., 2016) measured the association between coming-out stress, also described as disclosure of sexual identity stress, in bisexual men. In their study focusing on sexual identity disclosure, Politt et al. (2017)



found that bisexual men who received the lowest parental support reported the highest depressive symptoms when the stress of disclosing was high. Moderated by social support, disclosing sexual identity to family members for bisexual men was seen to have a significant effect on depressive symptomatology across studies (Politt et al., 2017; White et al., 2016). Compared with gay men, bisexual men were less likely to disclose sexual identity to family and therefore at an increased risk of depression (White, 2020). However, in their comparative analysis, Baams et al. (2015) found no significant association between coming-out stress and depression in young bisexual men, rather their results found a link between sexual orientation victimisation and depression.

Two studies reviewed internalised homophobia and its association to depression (Cain et al., 2017; Lee et al., 2019) with one study presenting a positive association (Cain et al., 2017) and the other study being too unclear to suggest a strength of association (Lee et al., 2019). Similarly, the quality of the data on negative health behaviours and bisexual men, the third most documented risk factor, was too low to develop conclusions (Kornblith et al., 2015; Taliaferro et al., 2017). Unlike in bisexual women, no studies reviewed the association between bisexual men and internalised bi-negativity.

## PARTICIPANTS PER INCLUDED STUDY SPLIT BY SUBGROUP\*

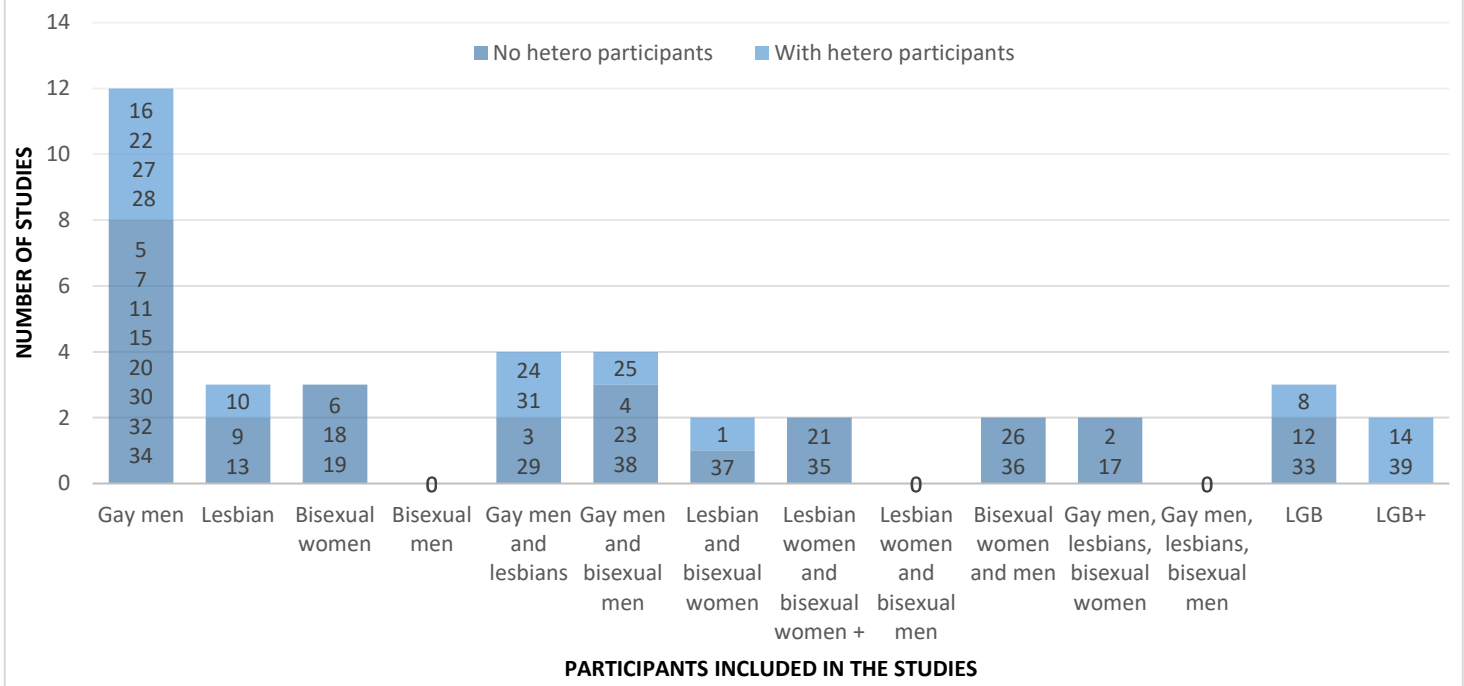


Figure 2 - Breakdown of participants across included studies: \*numbers correlate to study (#) number noted in Table 2.

Risk	Factor	Negative	Positive	No association	Unclear*
<b>Gay men</b>					
Internalised homophobia	Risk		X XXX		X
Sense of belonging	Protective	X XX		X	
Neuroticism	Risk		X X		X
<b>Lesbian women</b>					
Self-esteem	Protective	X XX			
Internalised homophobia	Risk		X	X	X
Social support	Protective	X X			
Sense of belonging	Protective	X		X	
<b>Bisexual women</b>					
Negative health behaviours	Risk		X		X XX
Internalised homophobia	Risk		X	X	X
Internalised bi-negativity	Risk		X X		
<b>Bisexual men</b>					
Disclosure of sexual identity stress	Risk		X X	X	
Internalised homophobia	Risk		X		X
Negative health behaviours	Risk				X X

Table 4. Most reported risk factor strength of association (vote count) for depression in gay men, lesbian women, bisexual women, and bisexual men. \*Quality of reporting too low to make a clear conclusion on strength of association.

## Discussion

The results of the included studies only partially support that risk factors for depression among gay men, lesbian women, and bisexual men and women differ. Included studies mainly focused on minority stress related variables while also considering subgroup specific variables, such as bi-negativity, and, as suggested in the three principal theories, distal and proximal stressors. Despite research focus varying heavily across LGB subgroups, the conceptual frameworks influence on chosen risk factors to assess within research, and therefore the data available for LGB, is evidently influenced and within the domain of the minority stress model. For gay men, the most researched risk factor, also the risk factor with the most consistent positive association to depression, was internalised homophobia. For lesbian women having high levels of self-esteem was conclusively protective against depression, therefore suggesting the inverse, low self-esteem, is a risk factor for depression. With two studies presenting a positive association to depression, bi-negativity was most associated for bisexual women. While for bisexual men, coming-out/ disclosure stress was the risk factors most positively associated with depression. Therefore, the most evaluated risk factors across LGB, although arguably different on the micro level, are situated within the Minority Stress Theory framework and ultimately are mediated by sexual identity status and heteronormativity.

A common thread that runs through many of the included studies is an affiliation, in terms of chosen risk factors to examine, to the minority stressors outlined in the Minority Stress Theory (Meyer, 1995) and also evident in Psychological Mediation Theory (Hatzenbuehler, 2009), particularly self-stigmatisation. For example, this was most apparent in the consistency in research focus on internalised homophobia. The results for internalised homophobia, other than in gay men where the association was reliably seen to be positive in four studies, were inconclusive. Results for lesbian women, bisexual women and bisexual men did not present a consistently significant association to internalised homophobia with one study each across the three subgroups showing a positive association, one study in lesbian and bisexual women showing no association, and one study per the three subgroups with low quality resulting in an association not being able to be inferred. Additionally, among bisexual women internalised homophobia was not consistent with internalised bi-negativity which was presented to be significant in two included studies. The Internalised

Homophobia scale (Wagner, 1989), collectively used in the included studies, was originally developed for American gay men in the 1980s and their experience of internalised homophobia (Mayfield, 2001). Therefore, this could explain why the results for internalised homophobia show a higher vote count and more consistent significance for gay men.

Arguably, the outlier amongst the most researched risk factors across LGB would be within the lesbian population, as self-esteem is both a protective factor and not implicitly linked to minority stress. However, this is easily debunked and able to further confirm the commitment to minority stress variables in LGB depression research. Firstly, the inverse of self-esteem is negative and dependant on whether it is conceptualised as a moderator (Meyer, 2003) or mediator (Hatzenbuehler, 2009), with ultimately the same impact on health outcomes. Secondly, considering presentation of oneself and how this translates into self-esteem, across studies greater body image dissatisfaction was associated with higher levels of depressive symptoms in lesbian women, though this can be moderated, as seen in Table 4., by an increased sense of belonging broadly, on an organizational level and to the lesbian community (Hanley & McLaren, 2015; Shenkman & Toussia-Cohen, 2020). The ability to build, or not to build, self-esteem is moderated by a sense of belonging, which was shown to be mediated by sexual minority status. Therefore, this places self-esteem in lesbian women in the minority stress framework, along with internalised homophobia/bi-negativity in gay men and bisexual women, and coming-out stress for bisexual men.

Similarly, in gay men, as outlined in Table. 4, a sense of belonging was seen to have a strong protective function against depression (Davidson et al., 2017; McLaren, 2020a; Morris et al., 2015). Consistent use of the Psychological Subscale of the Sense of Belonging was used across both the gay men and lesbian women studies that reported a negative association between sense of belonging and depression. Despite using different scales to review the strength of association to either the gay or lesbian community as a protective factors, both confirmed sense of community belonging as a factor able to moderate depression (Davidson et al., 2017; Hanley & McLaren, 2015; Morris et al., 2015). Therefore, confirming the importance of the community and a consistency in LG data. Sense of belonging was not included in the most research risk factors for bisexuals.

Negative health behaviours were reported in two studies with bisexual men and four studies with bisexual women, however, results from most studies were of too poor quality to infer.

The one study that did provide conclusive results presented a positive association in bisexual women between binge-drinking and depression (Molina et al., 2015). Future studies should provide critical attention to the relationship between negative health behaviours and depression across LGB, as currently there is a gap in research explaining the potential pathways to depression. The relationship between negative health behaviour and depression is challenging to examine as a direct causal relation is not always clear, due to not knowing which is the exposure and which is the outcome as both depression and negative health behaviours, such as binge-drinking, have been documented as risk factors for one another. This is especially difficult when using cross-sectional, rather than longitudinal, data as the timeline of the association cannot be accessed. As all the included studies used cross-sectional data (Gonzales & Henning-Smith, 2017; Molina et al., 2015; Nguyen et al., 2016; Taliaferro et al., 2018) this may explain why it was not possible to draw an association between negative health behaviours and depression.

Further, considering the 12 most researched risk factors (internalised homophobia, sense of belonging, self-esteem, social support, internalised bi-negativity, negative health behaviour, and sexual discourse stress) in the included studies outlined in Table 4., all (except neuroticism), can be conceptualised using one or more of the three frameworks poignant in this field. As gestated by MST, PMF and FCT, stigma and structural disadvantage can be associated with the majority of the researched risk factors for depression in LGB. Reviewing the full list of risk factors examined across studies, in the appendix, this trend continues. Therefore, positioning LGB influences on depression firmly within already distinguished hegemonic frameworks. The consistent commitment to minority related risk factors across included studies has both strengths and limitations. Loyalty to the principal theory's frameworks provides empirical evidence that sexual minority related stress is structurally embedded in society and is key in understanding the unique experiences of LGB. However, the lack of research on other risk factors, that lie outside of these models, prohibits a holistic understanding of the nuances of the LGB existence and does not provide space for alternative influences. Also, despite demographic data being collected across studies, rarely was it used in the statistical analysis to discover cofounders.

As is considered in the research question, these findings are largely dependent on the available data, which is limited by a high risk of bias, as shown in the NOS evaluation, and a

lack of equal commitment across LGB. Over half (69.9%) of studies included gay men with 27.5% only including gay men, while bisexual men, as highlighted by there being no bisexual men only studies. Two studies removed bisexual men due to the research sample being too small (Baams et al., 2015; McLaren, 2015) therefore highlighting researcher biased. Reporting on race and ethnicity was also lacking in the included studies with 53.84% not reporting ethnicity/race and 35.9% reporting 'mostly white' (60%+) participants. Despite this potentially being an issue of ethics, by not having data on race and ethnicity potential data on compound stressors (race and minority stress related risk factors) are lost and the argument for targeted funding for POC and racial minority specific interventions weakened (Scarr, 1988). Additionally, many studies were excluded from this review, due to presenting data across subgroups merged, despite there being evidence that data was collected separately as the sexual orientation breakdown was reports in the demographic characterises.

Furthermore, in critical analysis of the included studies, it must be noted that most studies utilised cross-sectional data, which involves its own range of constraints. Considering the study design of the included papers, only one paper used non-random sampling, with most using convenience sampling, the least representative sampling strategy, and relying on self-reporting via a Likert scale. Additionally, reviewing the instruments used in the studies, the internalised homophobia scale was not the only scale that could have potentially skewed the results of the current study due to being outdated. Over 80% of the outcome measurements were developed over 20 years ago, therefore being created in a very different contextual milieu. Overall, the main critique of the included studies lies in the lack of diversity, and consequential inability to recognise blind spots, in the available research on LGB across study design, participants (across subgroup, race, location and age) and the validity of the measurement instruments used.

Considering limitations of the methodology of the current study, the available data was further limited by decisions made in the data collection process. For example, the decision was made to remove articles that were not open access resulting in 44 of the 289 studies being removed based on this criteria. Additionally, including global data, although broadening the scope of the findings, added an implicit risk factor of cultural. Many articles were from the same location and the same authors, further decreasing study diversity and

global generalisability. It was hypothesised that funding origin could explain potential imbalances in the data, however this was not proven as patterns in funding origin were not found. Therefore, other consistencies must be examined to understand why the data in this review, and in general across LGB, contains such a high biased in subgroup attention.

This review also has several strengths. By following the PRISMA-ScR guidance, methodological rigor and transparency were ensured. All steps of the protocol were followed and working in a small team ensured consistency in coding, reliability, and less chance of a skew. The range of prominent databases used were multi-discipline covering psychology, sociology, medicine, and interdisciplinary social science from recognised global data resources. Another key strength of this review is its approach to assessing LGB risk factors per subgroup to obtain a comparative analysis of the available research and its findings. Generalisability within each subgroup was increased and the breaking-down of the minority stress variables made possible. Going one step further than a prevalence study, the current findings are able to provide evidence for the impact of the MST, PMF, and the FCT theories and their influence on both risk factors for and research on LGB depression.

Given the strengths and limitations of this review and its findings, several suggestions can be made for future practice. Firstly, this review confirms the importance of ensuring the data available, that will influence future interventions and policies, is reflective of the lesbian, gay and bisexual community. Special attention should be given to the populations that are under-represented in this review; this can only be achieved if separated data highlights inconsistencies. This could be achieved through small changes in data analysis.

Undeniably, minority stress continues to be a unique, but powerful burden on LGB mental health outcomes. This review joins a large body of evidence that suggests policy needs to address the structural disadvantage LGB are facing, which as the MST, PMF and FCT outline and is evident in the included studies in this review, is proven to result in distal and proximal stressors than are directly associated with depression across LGB. If policy can not immediately impact this hegemonic structure directly, due to its immersion into society, then community level interventions need to attempt to address proximal stressors at a community and individual level. This is where subgroup specific data is needed, so that national interventions can target L, G, B and decrease association to depression across most impactful minority stress variables, for example coming-out stress in bisexual men. On a

more local level, separated out data can also then be of use for subgroup specific LGB advocacy groups, such as Bi+ in the Netherlands, who require bisexual related data to develop interventions.

This review confirms that consistencies in risk factors for depression can be seen across LGB populations within the included studies. This was anticipated due to the homophobic structure of society, the narratives that queer scholars are working within and the hegemonic nature of the Minority Stress Theory in LGB research. As shown by the results of this review, the LGB research space continues to be dominated by a lack of diverse data which focus on white, gay men and tools that were developed for this population many decades ago. Considering the outputs of this review across lesbian women, gay men, and bisexual men and women, the current stands by its hypothesis that separate data is needed within sexual minority populations in order to develop community level interventions that are able to meet the specific minority stressor related needs of the sexual minority subgroups. As the findings of this review emphasise, first a more equal research commitment to the different subgroups is needed within academia.

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<https://doi.org/10.1007/s40894-019-00118-w>

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# Appendix

## 1. Data collection

### 1.1 Search log: PubMed, PsycINFO, Scopus.

<b>PubMed</b>	<b>778 results</b>
<p>("gender minority"[Title/Abstract] OR lesbian*[Title/Abstract] OR gay[Title/Abstract] OR bisexual*[Title/Abstract] OR "sexual minority"[Title/Abstract] OR "same sex"[Title/Abstract] OR homosexual*[Title/Abstract] OR "gender identity"[Title/Abstract] OR "non heterosexual*"[Title/Abstract] OR homosexuality[Title/Abstract] OR queer*[Title/Abstract] OR questioning[Title/Abstract] OR "non binary"[Title/Abstract] OR LGBT*[Title/Abstract] OR "sexual dissident*"[Title/Abstract] OR "sexual and gender minorities"[Title/Abstract] OR "gender variant"[Title/Abstract] OR gender-variant[Title/Abstract] OR genderqueer[Title/Abstract]) AND ("covariate"[Title/Abstract] OR "correlate"[Title/Abstract] OR "predictor"[Title/Abstract] OR "determinant"[Title/Abstract] OR moderat*[Title/Abstract] OR mediat*[Title/Abstract] OR "risk facto*"[Title/Abstract] OR mechan*[Title/Abstract] OR predict*[Title/Abstract] OR pathway[Title/Abstract] OR interact*[Title/Abstract] OR facto*[Title/Abstract] OR influence[Title/Abstract] OR correlate*[Title/Abstract] OR precurs*[Title/Abstract] OR "causal facto*"[Title/Abstract]) AND (depress*[Title/Abstract])</p>	
<b>PsycINFO</b>	<b>832 results</b>
<p>((("gender minority" or lesbian* or gay* or bisexual* or "sexual minority" or "same-sex" or homosexual* or "gender identity" or non-heterosexual* or "non heterosexual*" or homosexuality or queer* or questioning or "non-binary" or "non binary" or LGB* or "sexual dissident*" or "sexual and gender minorities" or "gender variant" or gender-variant or genderqueer) and ("covariate" or "correlate" or "predictor" or "determinant" or moderat* or mediat* or "risk facto*" or mechan* or predict* or pathway or interact* or facto* or influence or correlate* or precurs* or "causal facto*")) and depress*) AND limit (english language and yr="2015 - 2020") .ti,ab,id.</p>	
<b>Scopus</b>	<b>1540</b>
<p>( TITLE-ABS-KEY ( "gender minority" OR lesbian* OR gay* OR bisexual* OR "sexual minority" OR "same-sex" OR homosexual* OR "gender identity" OR non-heterosexual* OR "non heterosexual*" OR homosexuality OR queer* OR questioning OR "non-binary" OR "non binary" OR lgb* OR "sexual dissident*" OR "sexual and gender minorities" OR "gender variant" OR gender-variant OR genderqueer ) ) AND ( TITLE-ABS-KEY ( "covariate" OR "correlate" OR "predictor" OR "determinant" OR moderat* OR mediat* OR "risk facto*" OR mechan* OR predict* OR pathway OR interact* OR facto* OR influence OR correlate* OR precurs* OR "causal facto*" ) ) AND ( TITLE-ABS-KEY ( depress* ) ) AND ( LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2015 ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )</p>	

## 2. Data management

### 2.1 Excel used to collect information on included studies (n=39)

Authors	Title	Year	Country	Participants	Race/ethnicity	Study design	Risk factor	Measurement method	Statistical parameter of association	Funding
List all authors	Title of study presented in the reference	XXXX	Location of collection	(N=#) / age range and mean / gender / sexual identity	% of groups breakdown	Data used	Factor measured in relation to increased depression	Tool used to record association	Recorded strength of association between the risk factor and depression / unit given by paper	Copy and paste the acknowledgments and any additional information on funding

## 3. Data output

### 3.1 Included studies

#	Reference
1.	Aparicio-García, M. E., & Nieto, M. D. (2019). Exploring different profiles of gender (non)conformity in women and their relationship with sexual orientation and mental health. <i>Health Care for Women International, 0</i> (0), 1–21. <a href="https://doi.org/10.1080/07399332.2019.1687708">https://doi.org/10.1080/07399332.2019.1687708</a>
2.	Baams, L., Grossman, A. H., & Russell, S. T. (2015). Minority Stress and Mechanisms of Risk for Depression and Suicidal Ideation among Lesbian, Gay, and Bisexual Youth. <i>Dev Psychol., 176</i> (3), 688–696. <a href="https://doi.org/10.1037/a0038994">https://doi.org/10.1037/a0038994</a> .
3.	Bahamondes-Correa, J. (2016). System Justification's Opposite Effects on Psychological Wellbeing: Testing a Moderated Mediation Model in a Gay Men and Lesbian Sample in Chile. <i>Journal of Homosexuality, 63</i> (11), 1537–1555. <a href="https://doi.org/10.1080/00918369.2016.1223351">https://doi.org/10.1080/00918369.2016.1223351</a>
4.	Cain, D. N., Mirzayi, C., Rendina, H. J., Ventuneac, A., Grov, C., & Parsons, J. T. (2017). Mediating Effects of Social Support and Internalized Homonegativity on the Association between Population Density and Mental Health among Gay and Bisexual Men. <i>LGBT Health, 4</i> (5), 352–359. <a href="https://doi.org/10.1089/lgbt.2017.0002">https://doi.org/10.1089/lgbt.2017.0002</a>
5.	Davidson, K., McLaren, S., Jenkins, M., Corboy, D., Gibbs, P. M., & Molloy, M. (2016). Internalized Homonegativity, Sense of Belonging, and Depressive Symptoms Among Australian Gay Men. <i>Journal of Homosexuality, 64</i> (4), 450–465. <a href="https://doi.org/10.1080/00918369.2016.1190215">https://doi.org/10.1080/00918369.2016.1190215</a>
6.	Dyar, C., & London, B. (2018). Longitudinal Examination of a Bisexual-Specific Minority Stress Process Among Bisexual Cisgender Women. <i>Psychology of Women Quarterly, 42</i> (3), 342–360. <a href="https://doi.org/10.1177/0361684318768233">https://doi.org/10.1177/0361684318768233</a>
7.	Fingerhut, A. W. (2018). The Role of Social Support and Gay Identity in the Stress Processes of a Sample of Caucasian Gay Men. <i>Psychol Sex Orientat Gend Divers, 176</i> (1), 294–302. <a href="https://doi.org/10.1037/sgd0000271">https://doi.org/10.1037/sgd0000271</a>
8.	Gonzales, G., & Henning-Smith, C. (2017). Health Disparities by Sexual Orientation: Results and Implications from the Behavioral Risk Factor Surveillance System. <i>Journal of Community Health, 42</i> (6), 1163–1172. <a href="https://doi.org/10.1007/s10900-017-0366-z">https://doi.org/10.1007/s10900-017-0366-z</a>
9.	Hanley, S., & McLaren, S. (2015). Sense of Belonging to Layers of Lesbian Community Weakens the Link Between Body Image Dissatisfaction and Depressive Symptoms. <i>Psychology of Women Quarterly, 39</i> (1), 85–94. <a href="https://doi.org/10.1177/0361684314522420">https://doi.org/10.1177/0361684314522420</a>
10.	Kornblith, E., Green, R. J., Casey, S., & Tiet, Q. (2015). Marital status, social support, and depressive symptoms among lesbian and heterosexual women. <i>Journal of Lesbian Studies, 20</i> (1), 157–173. <a href="https://doi.org/10.1080/10894160.2015.1061882">https://doi.org/10.1080/10894160.2015.1061882</a>
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#### 4. NOS: The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of biased

##### 4.1 NOS for Cross-sectional data

<p>a) Truly representative of the average in the target population. (All subjects or random sampling)*</p> <p>b) Somewhat representative of the average in the target population. (non-random sampling) *</p> <p>c) Selected group of users.</p> <p>d) No description of the sampling strategy.</p>	<p><b>a) Comparability between respondents and non-respondents' characteristics is established, and the response rate is satisfactory. *</b></p> <p><b>b) The response rate is unsatisfactory, or the comparability between respondents and nonrespondents is unsatisfactory.</b></p> <p><b>c) No description of the response rate or the characteristics of the responders and the non-responders.</b></p>	<p><b>a) Validated measurement tool. *</b></p> <p><b>b) non-validated measurement tool, but the tool is available or described.</b></p> <p><b>c) No description of the measurement tool.</b></p>	<p><b>a) The study controls for the most important factor (select one). *</b></p> <p><b>b) The study control for any additional factor*</b></p>	<p><b>a) Independent blind assessment. *</b></p> <p><b>b) Record linkage. *</b></p> <p><b>c) Self report.</b></p> <p><b>d) No description.</b></p>	<p><b>a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). *</b></p> <p><b>b) The statistical test is not appropriate, not described or incomplete.</b></p>
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##### 3.2 NOS for Cohort data

Selection				Comparability	Outcome		
Maximum 3 stars				Maximum 2 stars	Maximum 3 stars		
Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start:	Comparability of cohorts on the basis of the design or analysis	Assessment of outcome	Was follow-up long enough for outcomes to occur	Adequacy of follow up of cohorts
<p>a) truly representative of the average _____ (describe) in the community*</p> <p>b) somewhat representative of the average _____ in the community *</p>	<p>a) drawn from the same community as the exposed cohort*</p> <p>b) drawn from a different source</p> <p>c) no description of the derivation of the non-exposed cohort</p>	<p>a) secure record (eg surgical records) *</p> <p>b) structured interview*</p> <p>c) written self-report</p> <p>d) no description</p>	<p>a) Yes*</p> <p>b) No</p>	<p>a) study controls for _____ (select the most important factor) *</p> <p>b) study controls for any additional factor* (This criterion could be modified to indicate specific</p>	<p>a) independent blind assessment*</p> <p>b) record linkage*</p> <p>c) self-report</p> <p>d) no description</p>	<p>a) yes (select an adequate follow up period for outcome of interest) *</p> <p>b) no</p>	<p>a) complete follow up - all subjects accounted for *</p> <p>b) subjects lost to follow up unlikely to introduce bias - small number lost - &gt; 40% (select an adequate %) follow up, or</p>



c) selected group of users eg nurses, volunteers d) no description of the derivation of the cohort				control for a second important factor.)			description provided of those lost)* c) follow up rate < 40% (select an adequate %) and no description of those lost d) no statement
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#### 4. Findings: Risk factor data

##### 4.1 Gay men (n=9,106)

#	Author	Risk factor
15	McLaren (2020) (1)	Demographic Characteristics; inc. Living Arrangement.
16	McLaren (2020) (2)	Demographic Characteristics; inc. Living Arrangement; Sense of Belonging.
32	Slimowicz (2020)	Rejection sensitivity; Sexuality openness; Anxiety symptoms.
11	Lawrenz (2019)	Sociodemographic; Enacted stigma; Internalized homonegativity; Concealment of sexual identity; Parenting styles.
27	Shenkman (2017)	Negative attitudes toward aging; Sexual orientation; Big Five Inventory; Happiness Scale
22	Oginni (2018)	Sociodemographic Variables, Family-Related Variables, Sexuality-Related Variables
17	McLauren (2016)	Demographic characteristics; Internalised homophobia; Suicide
31	Shenkman (2019b)	Physical Self-Concept, Sexual Orientation
12	Lee (2019)	Internalized Homophobia, Sociodemographic characteristics
7	Fingerhut (2018)	Demographic characteristics; Social Support; Gay Identity
34	Starks (2017)	Demographic characteristics; Relationship satisfaction; Eriksonian Intimacy Development
28	Shenkman (2019a)	Sexual orientation; Self-perception of parental role; Big Five inventory; Affect Balance
2	Baams (2016)	Background characteristics; LGB coming-out stress; Sexual orientation victimisation; Perceived burdensomeness; Thwarted belongingness; Others perceived knowledge of sexual identity; Suicidal ideation
29	Shenkman (2016)	The hostile-world; Life satisfaction; Gay identity; Self-Anchoring; Affect Balance; Big Five Inventory
14	Luk (2016)	Sexual orientation; Cyber behaviour; Time spent on video games; Frequency of phone use; Frequency of social media use; Psychosomatic symptoms; Optimism; Happiness; General health.
8	Gonzales (2017)	Physical and functional health; Activity limitations; Diagnosis by a doctor in activity cardiovascular disease (i.e. a heart attack, myocardial infarction, angina, or coronary heart disease), cancer (including skin cancer), arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), asthma, and chronic obstructive pulmonary disease (including emphysema or chronic bronchitis); Obesity; Smoking; Binge drinking.
3	Bahamondes-Correa (2016)	Sociodemographic characteristics; System justification; Internalized homonegativity
5	Davidson (2016)	Internalized homophobia; Sense of belonging; Sense of belonging within the gay community
4	Cain (2017)	Demographic characteristics; Population density; Internalized homonegativity; Social support

24	Petterson (2016)	Biographic information; Sexual orientation; Childhood patterns of gendered behavior; Adulthood patterns of gendered behavior; Indicators of separation anxiety;
38	White (2016)	Demographic characteristics; General disclosure of sexual identity; Disclosure of sexual identity to family, Relationships between gay and bisexual men and their families
23	Pereira (2020)	Demographic characteristics; Quality of life
30	Shenkman (2017)	Sexual orientation; HWS interpersonal vulnerability; Satisfaction from current relationship; Satisfaction With Life
20	Morris (2015)	Demographic characteristics; Sense of belonging; Sense of belonging in the gay community;
33	Smalley (2015)	Demographic characteristics; Interactions with the health care system;

### 3.2 Lesbians (n=8,101)

#	Author	Risk factor
39	Whitton (2020)	Romantic involvement; Problematic alcohol use; Problematic cannabis use; Demographic characteristics.
13	Lo (2019)	Gender roles; Self-esteem
1	Aparicio-García (2019)	Conformity to Feminine Norms; Self-esteem; Anxiety
10	Kornblith (2015)	Social support; Descriptive statistics; Marital status
35	Szalacha (2017)	Sexual identity; Experiences of interpersonal violence; Stress; Anxiety; Mental health index; Life satisfaction; Control variables
37	Wang (2020)	Demographic characteristics; Internalized homophobia; Self-esteem; Social support
2	Baams (2015)	Background characteristics; LGB coming-out stress; Sexual orientation victimization; Perceived burdensomeness; Thwarted belongingness; Others perceived knowledge of sexual identity; Suicidal ideation
29	Shenkman (2016)	The hostile-world; Life satisfaction; Gay identity; Self-Anchoring; Affect Balance; Big Five Inventory
14	Luk (2019)	Sexual orientation; Cyber behavior; Time spent on video games; Frequency of phone use; Frequency of social media use; Psychosomatic symptoms; Optimism; Happiness; General health
8	Gonzales (2017)	Physical and functional health; Activity limitations; Diagnosis by a doctor in activity cardiovascular disease (i.e. a heart attack, myocardial infarction, angina, or coronary heart disease), cancer (including skin cancer), arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), asthma, and chronic obstructive pulmonary disease (including emphysema or chronic bronchitis); Obesity; Smoking; Binge drinking.
3	Bahamondes-Correa (2016)	Sociodemographic characteristics; System justification; Internalized homonegativity
21	Nguyen (2016)	Demographic characteristics; Negative Treatment by Family; Personal well-being; Smoking status;
24	Petterson (2017)	Biographic information; Sexual orientation; Childhood patterns of gendered behavior; Adulthood patterns of gendered behavior; Indicators of separation anxiety;
9	Hanley (2015)	Demographic characteristics; Body dissatisfaction; Sense of belonging;
25	Pharr (2019)	Demographic characteristics; Sexual orientation;
33	Smalley (2015)	Demographic characteristics; Interactions with the health care system;
12	Lee (2019)	Internalized Homophobia, Sociodemographic characteristics
31	Shenkman (2019b)	Physical Self-Concept, Sexual Orientation

### 3.3 Bisexual women(n = 9,693).

#	Author	Risk factor
36	Taliaferro (2017)	Demographic characteristics; Bullying victimization; Marijuana use; Binge drinking; Other substance use; A same-sex sexual experience; Multiple lifetime sexual partners; Relationship violence; Physical activity; Sport participation; Adequate sleep.
6	Dyar (2018)	Sexual identity uncertainty; Internalized bi-negativity and illegitimacy of bisexuality; Strength of sexual identity identification; Anti-bisexual experiences; Frequency of anti-bisexual events; Characteristics of most stressful anti-bisexual event; Brief sexual identity uncertainty; Brief internalized bi-negativity; Visibility management; Internalizing symptomology; Anxiety; Proximal stressors and mental health
17	McLaren (2016)	Demographic characteristics; Internalized homophobia; Suicide
12	Lee (2019)	Internalized Homophobia, Sociodemographic characteristics
14	Luk (2019)	Sexual orientation; Cyber behaviour; Time spent on video games; Frequency of phone use; Frequency of social media use; Psychosomatic symptoms; Optimism; Happiness; General health.
1	Aparicio-García (2019)	Conformity to Feminine Norms; Self-esteem; Anxiety
18	McLaren (2020; 3)	Demographic characteristics; Sense of belonging
35	Szalacha (2017)	Sexual identity; Experiences of interpersonal violence; Stress; Anxiety; Mental health index; Life satisfaction
37	Wang (2020)	Demographic characteristics; Internalized homophobia; Self-esteem; Social support
2	Baams (2015)	Background characteristics; LGB coming-out stress; Sexual orientation victimisation; Perceived burdensomeness; Thwarted belongingness; Others perceived knowledge of sexual identity; Suicidal ideation
19	Molina (2015)	Current intimate relationship status; Bisexual minority stress; Outness; Internalized bi-negativity scale; Binge drinking; Alcohol-related consequences
8	Gonzales (2017)	Physical and functional health; Activity limitations; Diagnosis by a doctor in activity cardiovascular disease (i.e. a heart attack, myocardial infarction, angina, or coronary heart disease), cancer (including skin cancer), arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), asthma, and chronic obstructive pulmonary disease (including emphysema or chronic bronchitis); Obesity; Smoking; Binge drinking.
26	Politt (2017)	Demographic characteristics; Social support; Disclosure stress; Disclosure to family; Disclosure to friends.
21	Nguyen (2016)	Demographic characteristics; Negative Treatment by Family; Personal well-being; Smoking status;
25	Pharr (2019)	Demographic characteristics; Sexual orientation;
33	Smalley (2015)	Demographic characteristics; Interactions with the health care system;

### 3.4 Bisexual men (n=2,344)

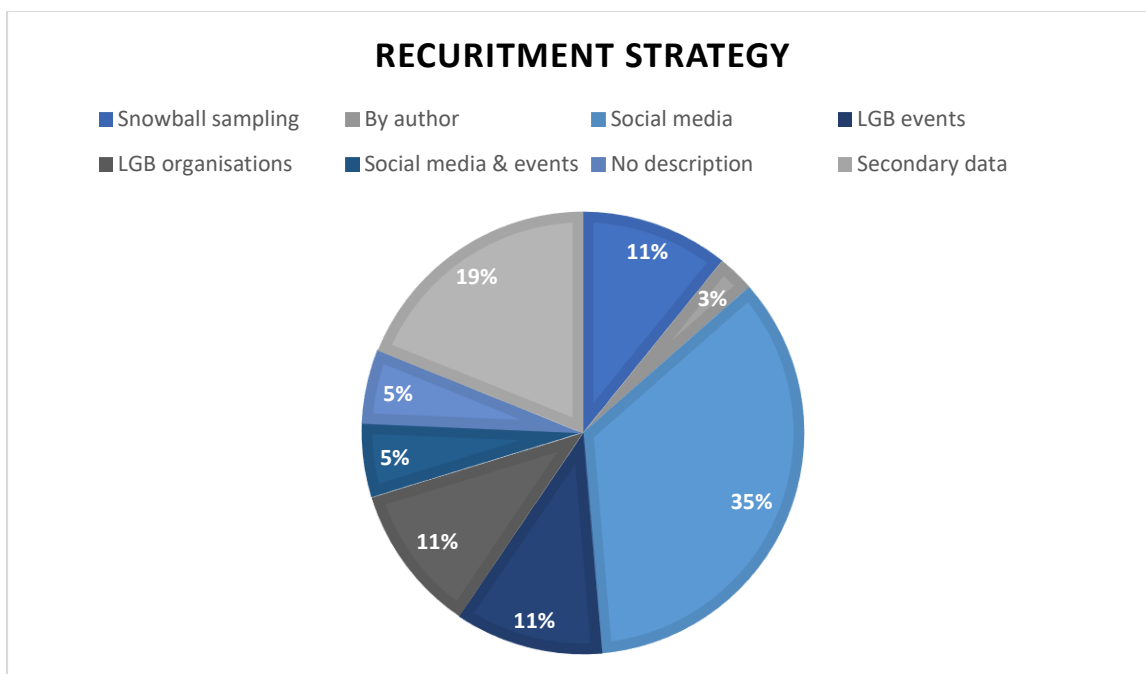
#	Author	Risk factor
36	Taliaferro (2017)	Demographic characteristics; Bullying victimization; Marijuana use; Binge drinking; Other substance use; A same-sex sexual experience; Multiple lifetime sexual partners; Relationship violence; Physical activity; Sport participation; Adequate sleep.
12	Lee (2019)	Internalized Homophobia, Sociodemographic characteristics
2	Baams (2015)	Background characteristics; LGB coming-out stress; Sexual orientation victimization; Perceived burdensomeness; Thwarted belongingness; Others perceived knowledge of sexual identity; Suicidal ideation

14	Lo (2019)	Sexual orientation; Cyber behavior; Time spent on video games; Frequency of phone use; Frequency of social media use; Psychosomatic symptoms; Optimism; Happiness; General health.
8	Gonzales (2017)	Physical and functional health; Activity limitations; Diagnosis by a doctor in activity cardiovascular disease (i.e. a heart attack, myocardial infarction, angina, or coronary heart disease), cancer (including skin cancer), arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), asthma, and chronic obstructive pulmonary disease (including emphysema or chronic bronchitis); Obesity; Smoking; Binge drinking.
4	Cain (2017)	Demographic characteristics; Population density; Internalized homonegativity; Social support
26	Politt (2017)	Demographic characteristics; Social support; Disclosure stress; Disclosure to family; Disclosure to friends.
38	White (2016)	Demographic characteristics; General disclosure of sexual identity; Disclosure of sexual identity to family, Relationships between gay and bisexual men and their families
23	Pereira (2020)	Demographic characteristics; Quality of life
33	Smalley (2015)	Demographic characteristics; Interactions with the health care system;

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## 5. Characteristic of included studies graphs

### 5.1 Recruitment strategy pie chart



## 5.1 Ethnicity and race reporting

Did not report ethnicity/race			Majority white participants		
1.	Aparicio-García (2019)	Spain	4.	Cain (2017)	United States
3.	Bahamondes-Correa (2016)	Chile	5.	Davidson (2016)	Australia
6.	Dyar (2018)	United States	7.	Fingerhut (2018)	United States
9.	Hanley (2015)	Australia	8.	Gonzales (2017)	United States
12.	Lee (2019)	South Korea	10.	Kornblith (2015)	United States
15.	McLaren (2020) (1)	Australia	11.	Lawrenz (2019)	Brazil
16.	McLaren (2020) (2)	Australia	14.	Luk (2019)	United States
17.	McLaren (2015)	Australia	19.	Molina (2015)	United States
18.	McLaren (2020) (3)	Australia	24.	Petterson (2017)	Canada
20.	Morris (2015)	Australia	25.	Pharr (2019)	United States
21.	Nguyen (2016)	Vietnam	32.	Slimowicz (2020)	Australia
22.	Oginni (2018)	Nigeria	33.	Smalley (2015)	United States
23.	Pereira (2020)	Portugal & Spain	34.	Starks (2017)	United States
27.	Shenkman (2017)	Israel	39.	Whitton (2020)	United States
28.	Shenkman (2019a)	Israel			
29.	Shenkman (2016)	Israel			
30.	Shenkman (2018)	Israel			
31.	Shenkman (2019b)	Israel			
35.	Szalacha (2017)	Australia			
37.	Wang (2020)	Taiwan			
38.	White (2016)	Jamaica			

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