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Mental Health in Sexual and Gender Minority Populations: A Systematic Review of Systematic Reviews With Narrative Synthesis and a Network Meta-Analysis of Suicide Attempts

Mattia Marchi[1,2], Giulia Ferrazzi[1,2], Giulia Pollice[1,2], Luca Pingani[1,2], Silvia Ferrari[1,2], Antonio Ventriglio[3] and Gian M. Galeazzi[1,2]

Abstract

Background: Sexual and gender minorities, collectively known as LGBTQIA+ individuals, experience disproportionate mental health disparities compared to their heterosexual/cisgender peers.

Aims: The aim of this systematic review was to synthesize high-quality evidence from previously published systematic reviews on mental health in the LGBTQIA+ population.

Method: PubMed was searched for systematic reviews on LGBTQIA+ mental health, published by September 1st, 2024. For each mental health outcome, a narrative synthesis of the findings was performed. Additionally, when included reviews reported case-control data suitable for pooled analysis, network meta-analyses with random-effects models were conducted to estimate the Odds Ratios (ORs) and 95% confidence intervals (95% CIs) for mental disorders across sexual and gender groups.

Results: Twenty systematic reviews were included, accounting for 5,164,641 LGBTQIA+ individuals. These focused on the following mental health outcomes: major depressive disorder (MDD, $n=7$), eating disorders (ED, $n=5$), anxiety disorders (AD, $n=5$), substance use disorder (SUD, $n=4$), alcohol use disorder (AUD, $n=1$), post-traumatic stress disorder (PTSD, $n=1$), and suicidality ($n=11$), all resulting more prevalent among LGBTQIA+ individuals compared to the general population. Network meta-analysis was possible only for suicide attempts (SA), finding the highest risk among bisexual individuals (OR = 6.43, 95% CI [4.43; 9.34]), followed by lesbian and gay individuals (OR = 4.54, 95% CI [3.42, 6.03]), sexual and gender minorities analyzed together (OR = 4.32, 95% CI [3.52, 5.30]), and transgender individuals (OR = 3.61, 95% CI [2.78, 4.67]). Geographical differences were also found, with transgender individuals being the group with the highest SA risk in Europe (OR = 7.22, 95% CI [4.83, 10.81]) and the lowest SA risk in Asia (OR = 1.84, 95% CI [0.68, 5.03]), suggesting potential socio-cultural influences or differences in participant selection.

Conclusions: LGBTQIA+ individuals experience significant mental health challenges compared to the general population. To reduce these disparities, more inclusive policies, supportive social environments, affirmative mental health care, and ongoing research into minority stressors and protective factors are essential.

Keywords

sexual and gender minority, LGBTQIA+, mental health, suicidality, minority stress

Introduction

Sexual orientation, gender identity, and gender expression are fundamental aspects of human identity and experience (Weiten, 1995).

While most people identify with a heterosexual orientation and a gender identity that aligns with their sex assigned at birth (cisgender), there has been increasing recognition and acceptance of diverse expressions of gender and sexuality over the past decade (Ventriglio & Bhugra, 2019).

[1]Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy
[2]Dipartimento ad Attività Integrata di Salute Mentale e Dipendenze Patologiche, Azienda USL-IRCCS di Reggio Emilia, Italy
[3]Department of Clinical and Experimental Medicine, University of Foggia, Italy

Corresponding author:
Gian M. Galeazzi, Dipartimento ad Attività Integrata di Salute Mentale e Dipendenze Patologiche, Azienda USL-IRCCS di Reggio Emilia, Via Giovanni Amendola 2, Reggio Emilia 42122, Italy.
Email: GianMaria.Galeazzi@ausl.re.it

Consequently, a growing proportion of the global population identifies as lesbian, gay, bisexual, transgender, queer, intersex, asexual, or other non-cisgender or non-heterosexual identities, collectively referred to as LGBTQIA+. Recent global surveys estimate that approximately 3% to 4% of the population identify as lesbian, gay, or bisexual, and about 1% identify as transgender or gender non-binary (Ipsos, 2023).

Despite progress in visibility and rights, LGBTQIA+ individuals continue to face substantial legal and social discrimination in many parts of the world, which contribute to minority stress (Herre & Arriagada, 2023). This concept explains the chronic stress faced by members of stigmatized groups, including LGBTQIA+ individuals (Mongelli et al., 2019). Stressors may be both distal, such as discrimination, microaggressions, and violence, and proximal, including internalized stigma, identity concealment, and anticipatory stress (Marchi, Corbellini, et al., 2024; Marchi, Travascio, Uberti, De Micheli, Quartaroli, et al., 2024; Meyer, 2003; Pascoe & Richman, 2009). As such, these stressors cumulatively contribute to a higher prevalence of adverse mental and physical health outcomes among LGBTQIA+ individuals (Frost & Meyer, 2023; Pascoe & Richman, 2009).

Understanding the concept of minority stress is essential to addressing the mental health disparities faced by LGBTQIA+ communities. If LGBTQIA+ individuals are indeed at risk for excess mental distress and disorders due to social stress, it is important to understand this risk, as well as factors that ameliorate stress and contribute to mental health (Meyer, 2003). While numerous research in this field has shown that compared to their heterosexual and cisgender counterparts, LGBTQIA+ individuals face higher risk for various mental health conditions, including post-traumatic stress disorder (PTSD), eating disorders (ED), suicidality, anxiety, depression, and substance use disorders (SUD; Mongelli et al., 2019; Semlyen et al., 2016), these studies often considered LGBTQIA+ as a unique group or focused on specific LGBTQIA+ groups, leading to heterogeneous estimates and lack of comparison among sexual and gender identities. Understanding the differential risk of adverse mental health outcomes among different LGBTQIA+ group might be important to plan targeted interventions.

Additionally, there is a lack of a comprehensive and up-to-date synthesis that consolidates the highest level of evidence on LGBTQIA+ mental health outcomes in a single resource. Such endeavor might be valuable for guiding research and clinical practice, informing educational initiatives, and policy-makers efforts toward mental health promotion among LGBTQIA+ individuals.

To address these gaps, we conducted a systematic review of systematic reviews and meta-analyses to consolidate current evidence on mental health outcomes among LGBTQIA+ individuals. Furthermore, we employed network meta-analysis to enable direct and indirect comparisons across LGBTQIA+ groups, to provide a nuanced understanding of differential risks. We focused on mental health condition most found in an association with experiences of minority stress, such as PTSD, ED, suicidality (including suicide attempt [SA] and suicide ideation [SI]), non-suicidal self-injury (NSSI), anxiety disorder (AD), major depressive disorder (MDD), and SUD.

Methods

Data Sources and Search Strategy

We searched PubMed (Medline) from inception until September 1st, 2024, using a combination of free-text and Medical Subject Headings (MeSH) related to "PTSD" OR "post-traumatic stress disorder*" OR "Suicid*" OR "Anxiety Disorder*" OR "Depressive Disorder*" OR "Substance-Related Disorder*" OR "Feeding and Eating Disorder*" AND "Sexual and Gender Minorities." No restrictions regarding language of publication or publication date were set.

Eligibility Criteria

We included systematic reviews of quantitative studies, with or without meta-analysis, that examined the prevalence of PTSD, or ED, or AD, or MDD, or SUD, or SA, or SI, or NSSI among LGBTQIA+ individuals of any age, with no additional restrictions on the population characteristics. We also included meta-analyses that provided a comparison of the risk of these mental health conditions between LGBTQIA+ groups and heterosexual or cisgender controls. We excluded studies that did not provide information on the prevalence of these conditions or those that focused solely on the association between mental health and other risk factors (e.g. studies investigating the prevalence of depression among LGBTQIA+ individuals living with human immunodeficiency virus [HIV] compared to non-HIV controls). Publications that were not a systematic review and systematic reviews of qualitative studies were also excluded. We only considered studies published in peer-reviewed journals, excluding conference abstracts and dissertations.

Terms and Definitions

LGBTQIA+ status was identified as self-reported. PTSD, ED, AD, MDD, and SUD should be defined according to standard operational diagnostic criteria (i.e. according to the Diagnostic and Statistical Manual of Mental Disorders [DSM]; American Psychiatric Association, 2022 or the International Classification of Diseases [ICD]; World Health Organization, 2018) or through participants' self-reporting. SA was defined as a life-threatening behavior, enacted with the intention to die, but did not cause death

for reasons beyond the will of the patient. SI was defined as the persistent thinking of suicide. NSSI were defined as self-inflicted injuries without the intention to die. We considered both self-reported and validated rating scales for suicidality.

Data Collection and Extraction

The records identified in the primary search were screened based on their titles and abstracts. The initial screening was followed by the analysis of full texts to check compliance with inclusion/exclusion criteria. A standardized form was used for data extraction. For each eligible review, the following information was extracted: (1) Study characteristics (first author last name, year of publication, study design, study aim, and number of studies included); (2) Participant characteristics (age, sexual or gender minority status, and pooled sample size); and (3) Outcome measures of interest, as the pooled prevalence of the mental health condition considered or the effect size of the comparison between LGBTQIA+ and control groups, and the key findings as reported in the published studies.

Strategy for Data Synthesis

When multiple meta-analyses addressed the same outcome and the authors presented data from the included studies in a case-control format, we pooled the data to conduct a new, larger meta-analysis. To avoid duplication, if the same study appeared in multiple meta-analyses, we included it only once, ensuring that each sample, rather than each publication, was the unit of analysis. First, we did pairwise meta-analyses (LGBTQIA+ vs. controls) using inverse-variance models with random effects (DerSimonian & Laird, 1986). For continuous outcome data, we calculated the Hedges' *g* standardized mean differences (SMDs) and the corresponding 95% confidence intervals (CIs); for dichotomous outcome data, we calculated the pooled odds ratios (ORs) and the corresponding 95% CIs (Higgins et al., 2024). The results were summarized using forest plots. Standard Q tests and the I^2 statistic (i.e. the percentage of variability in prevalence estimates attributable to heterogeneity rather than sampling error or chance, with values of $I^2 \geqslant 75\%$ indicating high heterogeneity) were used to assess between-study heterogeneity (Higgins & Thompson, 2002). We performed funnel plot analysis and the Egger test to investigate publication bias (Sterne et al., 2011). If analyses showed a significant risk of publication bias, we would use the trim and fill method to estimate the number of missing studies and the adjusted effect size (Duval & Tweedie, 2000; Sterne et al., 2008; Sutton et al., 2000; Terrin et al., 2003). Subgroup analysis and meta-regression were performed to examine sources of between-study heterogeneity. Subgroups were defined based on the countries and world regions where the samples were enrolled. Meta-regression analysis was performed on two social indicators: the Gini index, measuring the income inequality at the country level (Hasell, 2023), and the LGBT rights index, measuring the status of LGBT rights, laws, freedoms, and public attitudes toward LGBT people at the country level (Herre & Arriagada, 2023).

Next, we conducted random-effects network meta-analyses to compare each sexual and gender group as defined in the primary studies. We assumed that the amount of heterogeneity was the same for all comparisons and based the assessment of statistical heterogeneity in the entire network on the magnitude of the common τ^2 estimated from the network meta-analysis models (Jackson et al., 2014). We compared the magnitude of the heterogeneity variance with the empirical distribution (Rhodes et al., 2015; Turner et al., 2012). We used the loop-specific approach (Veroniki et al., 2013) and the design-by-treatment model (Higgins et al., 2012) to evaluate incoherence locally and globally, respectively. We established a hierarchy of competing interventions using surface under the cumulative ranking curve (SUCRA) and mean ranks (Salanti et al., 2011). We presented the results graphically using network graphs, forest plots, and rankograms.

The analyses were performed using the *meta*, *metafor*, and *netmeta* packages in R (Balduzzi et al., 2023; R Core Team, 2024; Schwarzer, 2021). Statistical tests were two-sided and used a significance threshold of $p < .05$.

In addition, a narrative synthesis of each study's findings was performed by grouping studies according to the reported mental health outcomes.

Results

Study Characteristics

As shown in Figure 1, from 96 records screened on title and abstract, 47 full texts were analyzed. The review process led to the selection of 20 systematic reviews (Cai et al., 2024; Campbell et al., 2024; Connolly & Gilchrist, 2020; di Giacomo et al., 2018; Gilbert et al., 2018; H. Lin et al., 2023; Y. Lin et al., 2021; Lucassen et al., 2017; Marchi, Arcolin, et al., 2022; Marchi et al., 2023; Marshall et al., 2015; Meneguzzo et al., 2018; Mezzalira et al., 2023; Miranda-Mendizábal et al., 2017; Nouri et al., 2023; O'Flynn et al., 2023; Pinna et al., 2022; Polidori et al., 2024; Salway et al., 2019; Valentine & Shipherd, 2018), corresponding to a total of 5,164,641 LGBTQIA+ individuals, which were included in the final selection and data synthesis.

Among the included studies, 9 (45%) were meta-analyses, while the remaining were systematic reviews with narrative synthesis. Nine studies (45%) focused on transgender and gender diverse (TGD) or exclusively transgender individuals, 5 (25%) on lesbian, gay, or bisexual individuals, and 6 (30%) on both sexual and gender minority populations. Most studies ($n = 16$, 80%) included both adolescents and adults, while the remaining four focused

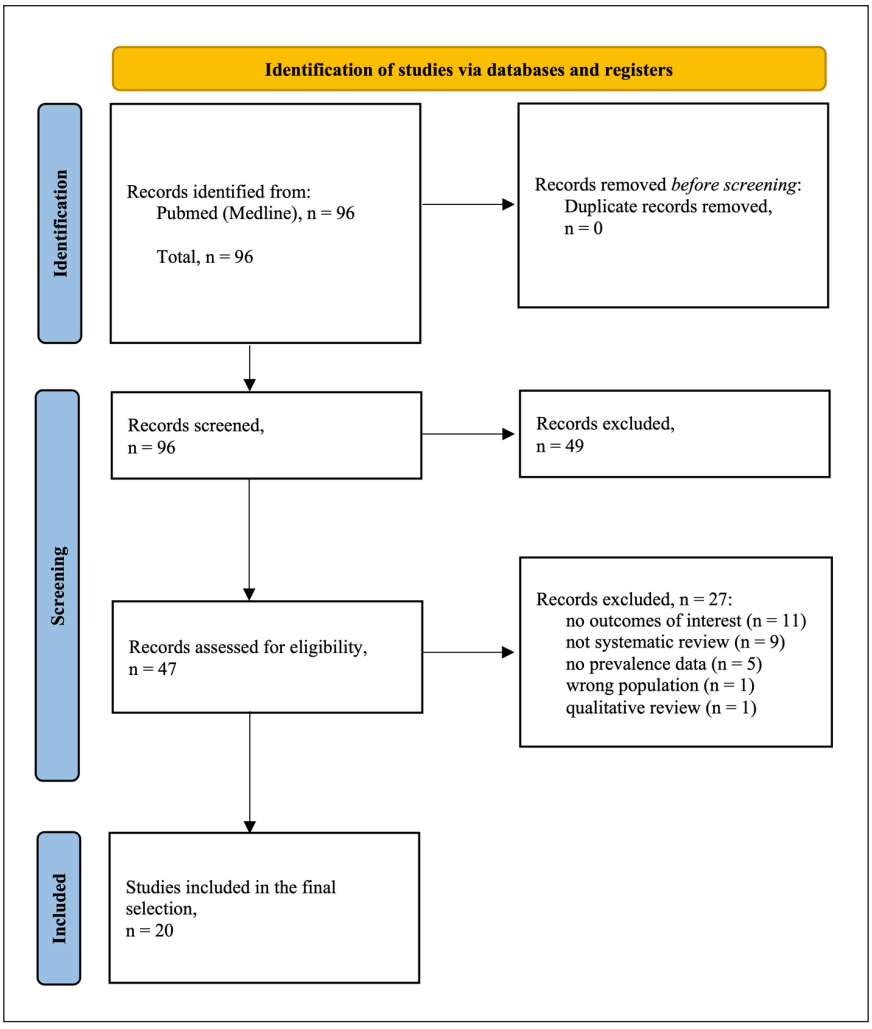

Figure 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow diagram.

exclusively on either minors or adults ($n=2$, 10% each). The number of studies included in the selected systematic reviews ranged from 7 to 260 (median = 43).

Five systematic reviews (25%) focused on more than one mental health outcome. The mental health outcomes examined were MDD ($n=7$, 35%), ED ($n=5$, 25%), AD ($n=5$, 25%), SUD ($n=4$, 20%), alcohol use disorder (AUD, $n=1$, 5%), PTSD ($n=1$, 5%), and suicidality ($n=11$, 55%). Suicidality was measured as SA in three studies, SA and SI in five studies, and SA, SI, and NSSI in three studies.

A summary of the characteristics of the included systematic reviews is reported in Table 1.

All the included systematic reviews reported an increased prevalence or risk of adverse mental health outcomes among LGBTQIA+ individuals compared to controls.

The aims and main findings of each study are summarized in Supplemental Table 1.

Suicidality and Non-Suicidal Self-Injury Among LGBTQIA+ Individuals

Among the 11 systematic reviews exploring suicidality and NSSI in LGBTQIA+ individuals, there were 3 meta-analyses providing SA data suitable for pooling the estimate (di Giacomo et al., 2018; Marchi, Arcolin, et al., 2022; Polidori et al., 2024). The new pairwise meta-analysis included 64 studies, yielding significant evidence of fourfold increased risk of SA among LGBTQIA+ individuals compared to heterosexual/cisgender controls (OR = 4.27, 95% CI [3.74, 4.89]), with high between-study heterogeneity ($I^2=99\%$). The results are displayed in Figure 2.

There was no evidence of publication bias as shown by the Egger's test ($p=.238$) and in the funnel plot displayed in Supplemental Figure 1.

To explore sources of between-study heterogeneity, we conducted a subgroup analysis based on the country where

Table 1. Characteristics of the Included Studies.

References	Outcome assessed	Sexual and gender minority group(s) *N*	*N* studies included	Strategy for data synthesis	Age range or group
Cai et al. (2024)	MDD	LGBTQIA+ *4,616,903*	48	Meta-analysis	Minors and adults
Campbell et al. (2024)	ED	TGD *NA*	26	Narrative synthesis	<18 yo
Connolly and Gilchrist (2020)	SUD	T *NA*	41	Narrative synthesis	⩾18 yo
di Giacomo et al. (2018)	SA	LGBT *113,468*	45	Narrative synthesis and meta-analysis	12–20 yo
Gilbert et al. (2018)	AUD	T *NA*	44	Narrative synthesis	Minors and adults
Y. Lin et al. (2021)	MDD, AD, SA, SI, NSSI	TGD *NA*	30	Narrative synthesis	12–62 yo
H. Lin et al. (2023)	MDD, AD, SI, SA	LGBT *182,330*	260	Meta-analysis	Minors and adults
Lucassen et al. (2017)	MDD	LGB *14,352*	23	Narrative synthesis and meta-analysis	Adolescents
Marchi, Arcolin, et al. (2022)	SA, SI, NSSI	LGBTQIA+ *87,252*	50	Meta-analysis	14–84 yo
Marchi et al. (2023)	PTSD	LGBTQ *31,903*	27	Meta-analysis	Minors and adults
Marshall et al. (2015)	SA, SI, NSSI	T *NA*	31	Narrative synthesis	Minors and adults
Meneguzzo et al. (2018)	ED	L *NA*	45	Narrative synthesis	Minors and adults
Mezzalira et al. (2023)	MDD, AD, ED, SUD	TGD *NA*	33	Narrative synthesis	<18 yo
Miranda-Mendizábal et al. (2017)	SA	LGB *1,634*	7	Meta-analysis	12–26 yo
Nouri et al. (2023)	SA, SI	G *11,821*	27	Meta-analysis	19–44 yo
O'Flynn et al. (2023)	ED	LGBTQIA+ *NA*	182	Narrative synthesis	Minors and adults
Pinna et al. (2022)	MDD, AD, ED, SA, SI, SUD, PTSD	T *NA*	165	Narrative synthesis	Minors and adults
Polidori et al. (2024)	SA	TGD *37,563*	35	Meta-analysis	Minors and adults
Salway et al. (2019)	SA, SI	LGB *67,415*	46	Meta-analysis	Minors and adults
Valentine and Shipherd (2018)	MDD, AD, SA, SI, SUD	TGD *NA*	77	Narrative synthesis	7–61 yo

Note. AD = anxiety disorder; AUD = alcohol use disorder; ED = eating disorder; G = gay; L = lesbian; LGBTQIA+ = lesbian, gay, transgender, queer, intersex, asexual, and any other sexual and gender minority group – variations of the acronym are used in accordance with the specific populations included in each study; MDD = major depressive disorder; N = number; NA = not applicable; NSSI = non-suicidal self-injury; PTSD = post-traumatic stress disorder; SA = suicide attempt; SI = suicide ideation; SUD = substance use disorder; T = transgender; TGD = transgender and gender diverse; yo = years old.

the sample was enrolled. The included studies were conducted in 17 countries across five of the six world regions (i.e. North America, Europe, Asia, South America, and Oceania), with no studies from Africa. A disproportionately high number of studies were conducted in the United States (USA, $n = 37$) compared to other countries, likely influencing the pooled estimate toward the USA's effect. In contrast, only one study was conducted in Switzerland, which did not find a statistically significant risk of SA among LGBTQIA+ individuals compared to controls. However, the test for subgroup differences in effect sizes was not statistically significant ($p = .092$). The results of

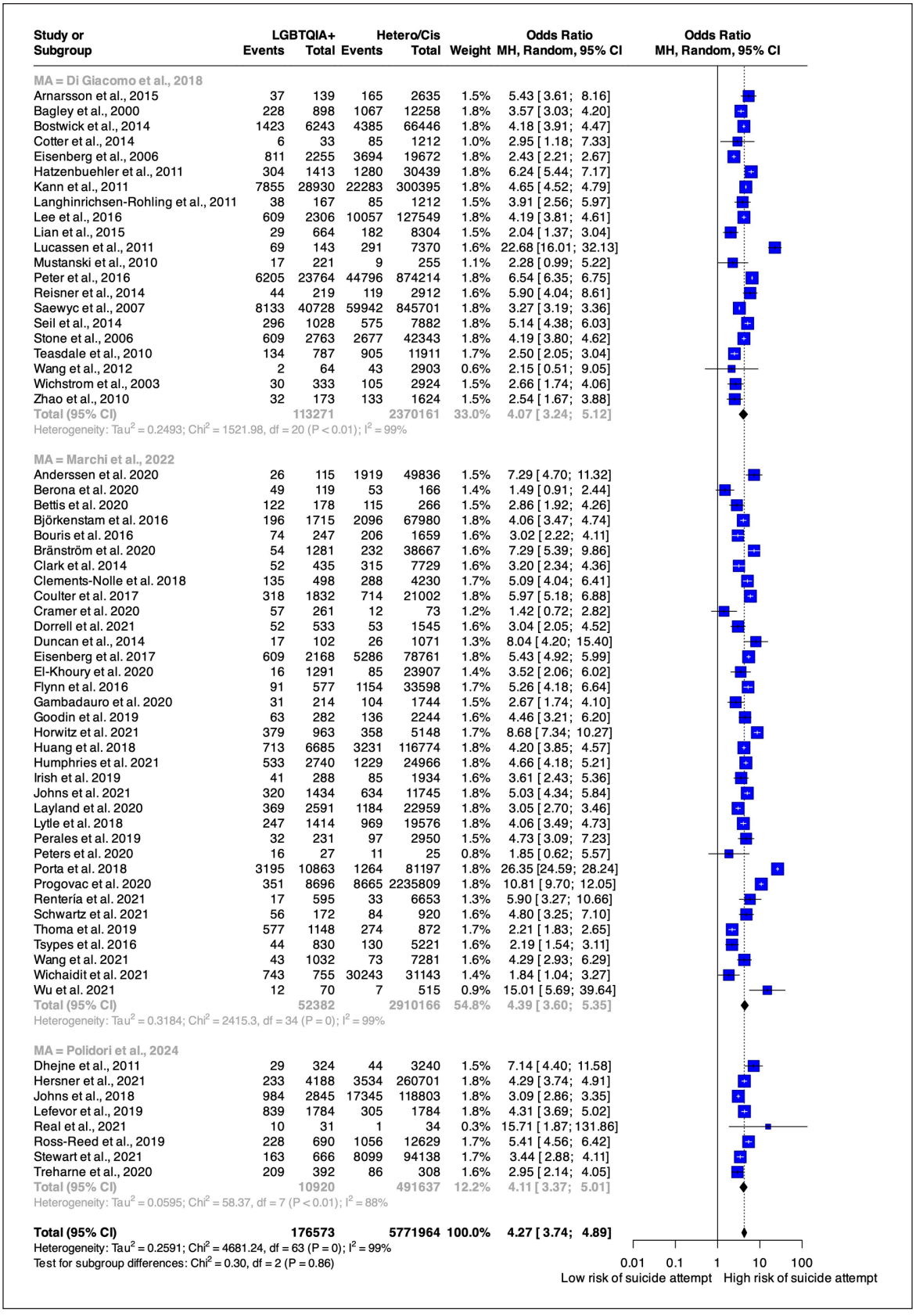

Figure 2. Forest plot of suicide attempts among LGBQIA+ and control groups.

Note. Cis = cisgender; Hetero = heterosexual; LGBTQIA+ = lesbian, gay, transgender, queer, intersex, asexual, and any other sexual and gender minority group; MA = meta-analysis; MH = Mantel-Haenszel method; 95% CI = 95% confidence interval.

Table 2. Subgroup Analysis of Suicide Attempts Among LGBTQIA+ and Controls According to the Study's Country.

World region	Country	*N* studies	*N* LGBTQIA+/ controls	*OR* [95% CI]	I^2 % (*p*-value)
North America	USA	37	132,807/4,288,371	4.25 [3.58, 5.05]	99% (<0.001)
Europe	Sweden	4	3,534/111,631	4.86 [3.08, 7.67]	86% (<0.001)
North America	Canada	3	24,603/969,976	3.96 [2.29, 6.85]	97% (<0.001)
Asia	China	3	8,381/132,359	3.40 [2.15, 5.36]	83% (<0.001)
Oceania	Australia	2	623/3,258	3.65 [2.30, 5.80]	67% (0.080)
Oceania	New Zealand	2	578/15,099	8.50 [1.25, 58.01]	99% (<0.001)
Europe	Norway	2	448/52,760	4.40 [1.63, 11.82]	91% (<0.001)
Europe	UK	2	315/1,959	3.18 [1.90, 5.32]	20% (0.260)
Europe	France	1	1,291/23,907	3.52 [2.06, 6.02]	NA
Europe	Iceland	1	139/2,635	5.43 [3.61, 8.16]	NA
Europe	Ireland	1	33/1,212	2.95 [1.18, 7.33]	NA
Europe	Switzerland	1	64/2,903	2.15 [0.51, 9.05]	NA
South America	Brazil	1	31/34	15.71 [1.87, 131.9]	NA
North America	Mexico	1	595/6,653	5.90 [3.27, 10.66]	NA
Asia	South Korea	1	2,306/127,549	4.19 [3.81, 4.61]	NA
Asia	Thailand	1	755/31,143	1.84 [1.04, 3.27]	NA
Asia	Taiwan	1	70/515	15.01 [5.69, 39.64]	NA

LGBTQIA+ = lesbian, gay, transgender, queer, intersex, asexual, and any other sexual and gender minority group; N = number; NA = not applicable; *OR* = odds ratio; UK = United Kingdom; USA = United States of America; 95% CI = 95% confidence interval.

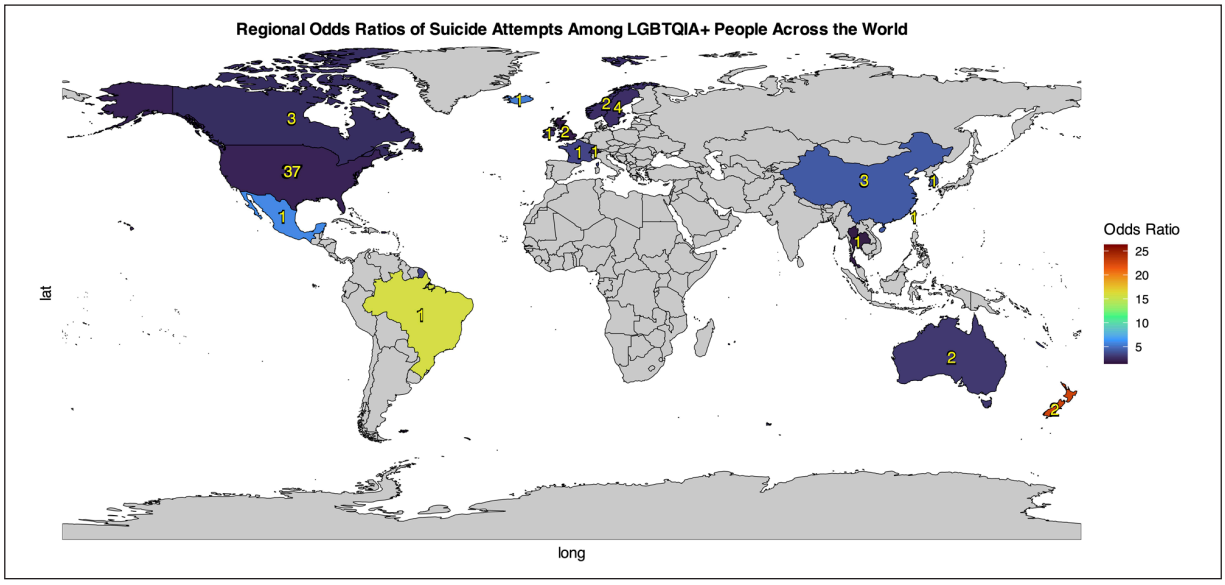

Figure 3. Global distribution of studies and pooled risk estimates for suicide attempts among LGBTQIA+ individuals and control groups.

the subgroup analysis by country are presented in Table 2 and Figure 3.

Univariable meta-regression on Gini index and LGBT right index did not find statistically significant effects (regression coefficient, Beta [*B*] = −.160, 95% CI [−2.88, 2.56]; *B* = .024, 95% CI [−0.040, 0.088], for Gini index and LGBT right index respectively).

To further understand the risk of SA in LGBTQIA+ population, we performed network meta-analysis of SA risk comparing each group directly and indirectly through a common comparator. The network plot of all available comparisons is displayed in Figure 4.

All LGBTQIA+ groups had a significantly higher risk of SA compared to the heterosexual and/or cisgender population. The SA risk was largely comparable across LGBTQIA+ groups. Among them, bisexual individuals had the highest risk (OR = 6.43, 95% CI [4.43, 9.34]), followed by lesbian and gay individuals (OR = 4.54, 95% CI

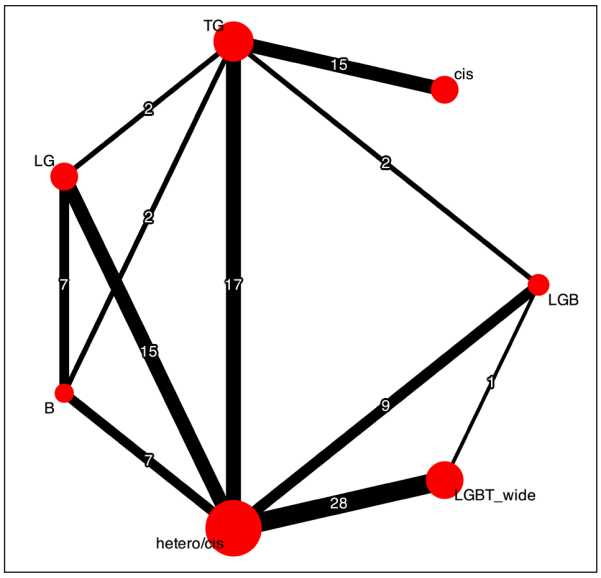

Figure 4. Network meta-analysis of eligible comparisons among sexual and gender populations for suicide attempts.
B = bisexual; cis = cisgender; hetero/cis = heterosexual and/or cisgender; LG = lesbian and gay; LGBT_wide = any sexual and gender minority group; TG = transgender. Legend = Width of the lines is proportional to the number of studies comparing every pair of sexual and gender groups. Size of every circle is proportional to the number of participants (i.e. sample size).

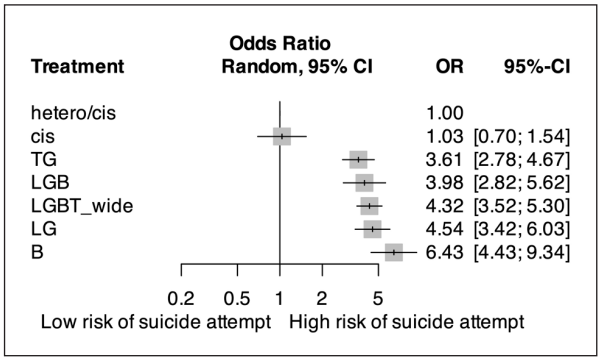

Figure 5. Forest plots of network meta-analysis of suicide attempt among sexual and gender groups.
B = bisexual; cis = cisgender; hetero/cis = heterosexual and/or cisgender; LG = lesbian and gay; LGBT_wide = any sexual and gender minority group; TG = transgender; 95% CI = 95% confidence interval. Legend = Sexual and gender groups were compared with heterosexual and/or cisgender individuals, which was the reference group.

[3.42, 6.03]), sexual and gender minorities considered together (OR = 4.32, 95% CI [3.52, 5.30]), and transgender individuals (OR = 3.61, 95% CI [2.78, 4.67]). Notably, the SA risk was significantly higher in bisexual individuals compared to transgender individuals (OR = 1.78, 95% CI [1.16, 2.75]).

Heterogeneity was high ($I^2 = 98\%$, $p < .001$), but there was no evidence of inconsistency between study designs ($p = .982$), supporting the validity of the network comparisons. Figure 5 shows the network meta-analysis results for SA risk among sexual and gender groups (see also Supplemental Figure 2 for all the comparisons).

Risk hierarchy for each sexual and gender group was evaluated based on 100 simulations and reported as cumulative probability plots and SUCRA available in Supplemental Table 2, and Supplemental Figure 3.

We also conducted subgroup network meta-analysis for each world region to explore potential differences in SA risk of sexual and gender groups. In North America, 53 studies supported 75 comparisons (see Supplemental Figure 4 for the network plot). The SA risk hierarchy across LGBTQIA+ groups was the same as in the main network meta-analysis, with bisexual individuals showing the highest SA risk, followed by lesbian/gay individuals, sexual and gender minority considered together, and transgender individuals. In Europe, based on 13 studies and 17 comparisons (see Supplemental Figure 5 for the network plot), the highest SA risk was found for transgender individuals, followed by bisexual individuals, sexual and gender minorities considered together, and lesbian/gay individuals. In Asia, based on eight studies and eight comparisons (see Supplemental Figure 6 for the network plot), lesbian/gay individuals and sexual and gender minorities analyzed together had comparable and elevated SA risk compared to the general population. Interestingly, transgender individuals also showed an increased risk of SA, though this was not statistically significant different from that of the general population. In Oceania, there were four studies accounting for four comparisons (see Supplemental Figure 7 for the network plot) yielding evidence of increased SA risk for sexual and gender minorities considered together and transgender individuals. In South America, only one study was available (see Supplemental Figure 8 for the network plot) comparing cisgender and transgender individuals, finding a higher risk of SA among the latter. The full results of these network meta-analyses are available as Supplemental Figures 9–13.

The other systematic reviews confirmed an increased risk of SA, SI, and NSSI among LGBTQIA+ individuals. Additionally, some studies reported a higher risk of SA and NSSI among sexual and gender minorities assigned male at birth (Marshall et al., 2015; Miranda-Mendizábal et al., 2017), while H. Lin et al. (2023) found a higher risk of SA and SI among lesbian individuals compared to gay individuals. Overall, the elevated SA risk among bisexual individuals, higher than that of lesbian and gay individuals, and the lowest risk of SA among heterosexual individuals, were also observed in the review by Salway et al. (2019).

Depression Among LGBTQIA+ Individuals

Seven systematic reviews, including three meta-analyses, examined MDD among LGBTQIA+ individuals. The

meta-analysis by Cai et al. (2024) estimated an overall MDD prevalence of 32%, with higher rates observed in LGBTQIA+ populations from the USA compared to other countries. Similarly, Lucassen et al. (2017) found significantly higher MDD rates among sexual minorities than their heterosexual peers, reporting more than twofold increased probability and a moderate effect size. Notably, their findings indicated that female sexual minority youth were particularly affected. Findings from China aligned with these trends. The meta-analysis by H. Lin et al. (2023) estimated an MDD prevalence of 42% among sexual minorities in China, with rates influenced by factors such as assessment methods and detection time. However, in contrast to Lucassen et al. (2017), H. Lin et al. (2023) found a higher prevalence of MDD among homosexual men than among women. Y. Lin et al. (2021) focused on TGD individuals in mainland China and reported an even higher MDD prevalence of 47.3%. Consistent with these findings, reviews by Pinna et al. (2022), Valentine and Shipherd (2018), and Mezzalira et al. (2023) also documented elevated MDD prevalence among TGD individuals, attributing these disparities to stigma, discrimination, and minority stress. However, they also highlighted potential protective factors, including social support, community connectedness, and effective coping strategies.

Anxiety Among LGBTQIA+ Individuals

The five included systematic reviews on AD among LGBTQIA+ individuals focused on TGD populations. The meta-analysis by H. Lin et al. (2023) estimated an AD prevalence of 32% among sexual minorities in China, while Y. Lin et al. (2021) reported an even higher AD prevalence of 40% among TGD individuals in mainland China. The remaining three reviews (Mezzalira et al., 2023; Pinna et al., 2022; Valentine & Shipherd, 2018) provided narrative descriptions, consistently confirming the elevated risk of AD among TGD individuals.

Eating Disorders Among LGBTQIA+ Individuals

Five systematic reviews with narrative synthesis of the findings suggested that sexual minority women and TGD individuals face an elevated risk of EDs compared to their heterosexual and cisgender peers. O'Flynn et al. (2023) documented an increased risk of EDs among sexual minorities, exploring different methods of defining sexual minority status to enhance either statistical power or specificity. Meneguzzo et al. (2018) focused on sexual minority women, finding a higher prevalence of ED diagnoses in this group. Notably, lesbian individuals were more likely to experience binge eating and purging episodes but reported lower body dissatisfaction and drive for thinness compared to heterosexual women. The remaining three systematic reviews focused on TGD populations (Campbell et al., 2024; Mezzalira et al., 2023; Pinna et al., 2022). Given the high risk of EDs in this group, Campbell et al. (2024) emphasized the need to integrate ED screening and treatment into gender-affirming care, as well as a nuanced assessment of gender identity in ED treatment settings.

Substance Use and Alcohol Use Disorders Among LGBTQIA+ Individuals

The five included systematic reviews focused on TGD populations. Four examined the prevalence of SUD, while one addressed AUD. Connolly and Gilchrist (2020) reported a higher prevalence of SUD among transgender individuals compared to their cisgender counterparts. They identified key contributing factors including transphobic discrimination, unemployment, engagement in sex work, gender dysphoria, and societal incongruence in gender expression. This review also highlighted critical research gaps, such as the underrepresentation of non-binary individuals, the overreliance on cross-sectional studies, and the lack of research outside North America. Findings from Mezzalira et al. (2023), Pinna et al. (2022), and Valentine and Shipherd (2018) further confirmed elevated rates of SUD in TGD populations, attributing these disparities to minority stress processes and societal pressures. These reviews emphasized the need for inclusive, evidence-based prevention and intervention strategies tailored to the unique challenges faced by TGD individuals. Regarding alcohol use, Gilbert et al. (2018) found a high prevalence of hazardous drinking among transgender individuals, though estimates varied widely due to methodological inconsistencies across studies. The review underscored the need for clearer definitions of hazardous drinking and more rigorous study designs to improve the accuracy of prevalence estimates. Reported prevalence rates ranged from 7% to 61% for binge drinking; 25% to 58% for drinking to intoxication; 26% and 11% for lifetime and past-year AUD, respectively.

PTSD Among LGBTQIA+ Individuals

Only one systematic review with meta-analysis examined the risk of PTSD among LGBTQ individuals (Marchi et al., 2023). Based on 27 primary studies, the meta-analysis found that LGBTQ individuals displayed twofold higher risk of developing PTSD compared to their heterosexual/cisgender peers. Additionally, transgender individuals exhibited the highest risk, followed by bisexual individuals. The review also highlighted a significant gap in research on intersex and non-binary populations, underscoring the need for more inclusive studies.

Discussion

This systematic review aimed to consolidate evidence on mental health disparities among LGBTQIA+ individuals. Findings from 20 systematic reviews consistently documented

an association between sexual and gender minority status with several mental health conditions, including MDD, AD, SUD, AUD, ED, PTSD, and suicidality.

These disparities derive from a complex interplay of social, structural, and psychological factors. Experiences of minority stress, including discrimination, social rejection, and identity concealment, have been mainly reported among the included studies. Additionally, some studies has shown these intersect with other vulnerabilities, such as living with HIV (H. Lin et al., 2023; Nouri et al., 2023), engaging in sex work (Connolly & Gilchrist, 2020), the stage of transition for transgender individuals (Marshall et al., 2015), leading to higher mental health burden. However, social support and community connectedness have been identified as key protective factors, mitigating the negative impact of minority stress on mental health (Valentine & Shipherd, 2018).

SUD, including AUD, were particularly concerning among LGBTQIA+ populations, especially among TGD individuals. The association between minority stress and substance use has been well documented, with substances often used as a maladaptive coping strategy for managing discrimination and psychological distress (Connolly & Gilchrist, 2020; Valentine & Shipherd, 2018). Additionally, structural factors such as economic marginalization, employment discrimination, and engagement in survival sex work has been associated with even higher risk of SUD in these populations (Connolly & Gilchrist, 2020; H. Lin et al., 2023). Similarly, ED and suicidality stands at the intersection of maladaptive coping behaviors and the internalizing effects of minority stress, particularly MDD, AD, and PTSD. In the included reviews, suicidality and ED have been linked with feelings of body dissatisfaction, lack of visibility, and perceived pressure to conform within the community (Campbell et al., 2024; Meneguzzo et al., 2018).

The pooled analysis of SA quantitatively suggested, on average, a fourfold increased risk among LGBTQIA+ individuals compared to heterosexual/cisgender peers, with subgroup estimates ranging from threefold to sixfold elevation. Although statistical heterogeneity between studies was high, qualitative heterogeneity was limited, as all included studies consistently indicated an elevated risk of SA. Meta-regression and subgroup meta-analysis based on country-level characteristics, including Gini and LGBTright indices, did not find statistically significant moderators of SA risk. However, the network meta-analysis provided qualitative insights into geographic differences, likely reflecting different societal attitudes toward LGBTQIA+ groups. Considering the substantial heterogeneity, complementing quantitative synthesis with a focused narrative interpretation allowed for a more meaningful contextualization of the findings.

Overall, transgender and bisexual individuals exhibited the highest risk for adverse mental health outcomes. These risks were also partly moderated by the stage of gender transition (Marshall et al., 2015). Bisexual individuals also face specific challenges, including monosexism, bisexual erasure, and a lack of affirmative social support (Salway et al., 2019). These factors contribute to their increased risk of mental health conditions, particularly for PTSD and suicidality (Marchi, Arcolin, et al., 2022; Marchi et al., 2023). From a social perspective, the invisibility and exclusion experienced by bisexual and transgender individuals might be explained as these groups challenges binary thinking and normative assumptions. Embracing an ethical perspective able to account for fluidity and multiplicity, such as queer ethics, might create a more inclusive framework that accounts for the experiences of all members of the LGBTQIA+ communities (Däumer, 1992).

The findings underscore the necessity for targeted interventions aimed at addressing the specific mental health needs of LGBTQIA+ individuals. Mental health professionals should receive training in LGBTQIA+ affirmative practices to enhance their cultural competence. For example, the assessment of factors related to the "coming-out" should be conducted with non-judgmental attitudes and eventually supported by the health professional. Therapeutic approaches should integrate affirmative psychotherapy principles, which emphasize validation of sexual and gender identities, the reduction of internalized stigma, and the promotion of resilience, often within a cognitive-behavioral framework (Harkness et al., 2024). Fostering social support, including family relationships, friendships, and community connections, is also crucial for buffering against minority stress. Previous research has shown that attachment-based, systemic psychotherapeutic interventions can reduce suicidal ideation and depression in LGBTQIA+ individuals (Diamond et al., 2012; Russon et al., 2023), and may also be beneficial in the context of SUD (Ryan et al., 2010). Furthermore, multidisciplinary collaboration is essential in gender-affirming care, ensuring that individuals seeking medical transition receive comprehensive and affirming support from mental health providers, endocrinologists, and surgeons (Ventriglio et al., 2024). Integrating mental health and sexual and gender assessments in clinical practice should be reciprocal. For example, according to the results of the current study, assessment of body dissatisfaction and ED should be promoted in gender affirming clinics, as well as the assessment of gender identity and gender dysphoria should be conducted in ED clinics (Campbell et al., 2024). Evidence suggests that despite their mental health burden, LGBTQIA+ patients often avoid seeking medical support for fear of rejection and heteronormative healthcare environments (Marchi, Laquatra, et al., 2024; Silveri et al., 2022), improving healthcare providers competence in LGBTQIA+ health needs would ultimately improve service accessibility.

Policy-level changes are also imperative to reduce structural inequalities and foster more inclusive environments. Legislative protections against interpersonal violence and discrimination toward LGBTQIA+ individuals

are needed. Alongside, LGBTQIA+ inclusive educational programs should be promoted. Additionally, public health initiatives should prioritize stigma reduction and community-based interventions to enhance support networks for LGBTQIA+ individuals (Ventriglio et al., 2022).

Future research should aim to fill existing gaps in the literature by increasing representation of underrepresented subgroups, such as non-binary and intersex individuals, and by employing methodologically rigorous designs, including longitudinal studies, to better understand causal relationships. Moreover, research should explore intersectional factors that compound mental health risks, such as race, socioeconomic status, and disability, to develop more nuanced and effective intervention strategies (Abbas et al., 2021; Marchi, Alkema, et al., 2024; Marchi, Magarini, et al., 2022; Mereish et al., 2023; Vaccaro & Koob, 2019). Case studies of inclusive and supporting environments should be promoted, along with efforts to replicate these models across different sociocultural contexts to identify scalable and effective policy-society-healthcare integration strategies.

Limitations

Although this review synthesized high-quality evidence from systematic reviews and meta-analyses, some limitations should be considered when interpreting the findings. First, most of the included studies were conducted in North America, particularly in the USA, which may limit the generalizability of the results. This geographic bias could skew the overall effect estimates toward those observed in USA populations. Additionally, this limited the generalizability of the findings to other low- and middle-income countries where socio-cultural determinants of mental health, stigma, and access to care may differ substantially. Future research should aim for a broader geographic representation to increase external validity. Second, the assessment of sexual and gender minority status was inconsistent across the included studies. This has particularly limited our ability to perform comparisons across sexual and gender subgroups, such as in the network meta-analysis. A more standardized approach to defining sexual and gender identity, along with the implementation of inclusive demographic data collection methods that account for the full spectrum of sexual and gender identities is needed to improve the precision and applicability of the findings. Third, this review focused on the most studied mental health conditions associated with minority stress in LGBTQIA+ individuals. While the range of conditions examined was extensive, other relevant conditions, such as neurodevelopmental disorders (e.g. autism spectrum disorder and attention-deficit and hyperactivity disorder), psychotic disorders, and personality disorders, were not included. Finally, the literature search was conducted exclusively in PubMed, which may have limited the comprehensiveness of the review with potential risk of publication bias. As such, the search strategy does not fully satisfy the methodological standards outlined in the PRISMA checklist.

Conclusions

The evidence synthesized in this review highlights the significant mental health disparities experienced by LGBTQIA+ individuals and underscores the urgent need for inclusive policies, supportive social environments, affirmative mental health care, and continued research to reduce these inequities. Addressing minority stressors, enhancing protective factors, and fostering structural and societal acceptance are fundamental to reducing the burden of mental illness in LGBTQIA+ populations.

A key limitation of the current evidence is the underrepresentation of intersex, non-binary, and Two-Spirit individuals. This gap limits the generalizability of findings and raises important ethical concerns regarding visibility, inclusion, and equity in research. Future studies should prioritize more inclusive data collection and reporting practices to ensure that the full diversity of sexual and gender minority populations is adequately represented and studied.

ORCID iDs

Mattia Marchi https://orcid.org/0000-0003-2970-1276
Giulia Ferrazzi https://orcid.org/0009-0005-1103-493X
Giulia Pollice https://orcid.org/0009-0005-1625-187X
Luca Pingani https://orcid.org/0000-0003-3428-8308
Silvia Ferrari https://orcid.org/0000-0001-7929-4520
Antonio Ventriglio https://orcid.org/0000-0002-3934-7007
Gian M. Galeazzi https://orcid.org/0000-0003-2706-3362

Ethical Considerations

This systematic review is exempt from ethics approval because we collected and synthesized data from previous studies in which ethical approval has already been obtained by the trial investigators in their respective local sites.

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The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Supplemental Material

Supplemental material for this article is available online.

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