



Review article

Risk and protective factors for self-harm thoughts and behaviours in transgender and gender diverse people: A systematic review

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ABSTRACT

Background: Self-harm (any self-injury or -poisoning regardless of intent) is highly prevalent in transgender and gender diverse (TGD) populations. It is strongly associated with various adverse health and wellbeing outcomes, including suicide. Despite increased risk, TGD individuals' unique self-harm pathways are not well understood. Following PRISMA guidelines we conducted the first systematic review of risk and protective factors for self-harm in TGD people to identify targets for prevention and intervention.

Methods: We searched five electronic databases (PubMed, PsychInfo, Scopus, MEDLINE, and Web of Science) published from database inception to November 2023 for primary and secondary studies of risk and/or protective factors for self-harm thoughts and behaviours in TGD people. Data was extracted and study quality assessed using Newcastle-Ottawa Scales.

Findings: Overall, 78 studies published between 2007 and 2023 from 16 countries (N = 322,144) were eligible for inclusion. Narrative analysis identified six key risk factors for self-harm in TGD people (aged 7–98years) were identified. These are younger age, being assigned female at birth, illicit drug and alcohol use, sexual and physical assault, gender minority stressors (especially discrimination and victimisation), and depression or depressive symptomatology. Three important protective factors were identified: social support, connectedness, and school safety. Other possible unique TGD protective factors against self-harm included: chosen name use, gender-identity concordant documentation, and protective state policies. Some evidence of publication bias regarding sample size, non-responders, and confounding variables was identified.

Interpretation: This systematic review indicates TGD people may experience a unique self-harm pathway. Importantly, the risk and protective factors we identified provide meaningful targets for intervention. TGD youth and those assigned female at birth are at increased risk. Encouraging TGD people to utilise and foster existing support networks, family/parent and peer support groups, and creating safe, supportive school environments may be critical for self-harm and suicide prevention strategies. Efforts to reduce drug and alcohol use and experiences of gender-based victimisation and discrimination are recommended to reduce self-harm in this high-risk group. Addressing depressive symptoms may reduce gender dysphoria and self-harm. The new evidence presented in this systematic review also indicates TGD people may experience unique pathways to self-harm related to the lack of social acceptance of their gender identity. However,

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robust longitudinal research which examines gender-specific factors is now necessary to establish this pathway.

1. Introduction

Self-harm (defined here as any self-injury or -poisoning regardless of intent [1,2]) is an important public health concern [3] and is associated with various negative health and wellbeing outcomes. These include substance abuse [3,4], reduced education and employment [3] prospects, and exacerbating existing mental health issues [5]. Most concerning, self-harm is the strongest known predictor of death by suicide [5]. Transgender and gender diverse (TGD) people are at significantly higher risk of self-harm compared to cisgender people [6,7]. Broadly, TGD describes people whose birth-assigned sex misaligns with their gender identity [8,9]. Cisgender (cis) describes people whose gender identity aligns with their birth-assigned gender and body [10]. Self-harm is highly prevalent in TGD people. Lifetime TGD self-harm prevalence estimates range between 46.4% [11,12] and 53.3% [13] compared to 6.4% in the general population [14]. Similarly, TGD people are at increased risk of suicidal thoughts [15] and behaviours [16]. Worryingly, almost 45% of TGD people attempt suicide [17], compared to 11.3% in the general population [18]. Furthermore, TGD people are at increased self-harm risk compared to their lesbian and gay peers. A recent meta-analysis reported TGD self-harm prevalence rates of 46.65% compared to 29.68% in sexual minority individuals [12]. The high prevalence of self-harm and adverse health and wellbeing outcomes indicate the need to understand TGD self-harm and identify key intervenable targets in this high-risk group.

As with the general population, TGD self-harm is multi-faceted and complex. However, TGD people experience a wider array of self-harm factors. Alongside risk factors for self-harm also experienced by the general population, such as hopelessness [19] and depression [3,20], TGD people also experience TGD-specific self-harm risk factors. For example, studies have identified experiences of transphobia [11], stigma [13,15], victimisation [4,7], and gender dysphoria [13] as significant correlates of self-harm in TGD people. These TGD-specific experiences may directly influence self-harm. They may also result in higher rates of depression, anxiety, or hopelessness which, in turn, might mediate the relationship between TGD-specific factors and self-harm [21]. Indeed, a longitudinal study of self-harm predictors in LGBT (Lesbian, Gay, Bisexual, and Transgender [20,22]) youth found hopelessness and depression fully or partially mediated the relationship between self-harm and LGBT victimisation, perceived family support, and conduct disorder [20]. Other studies report victimisation, prejudice, and discrimination, in particular, to be correlated with increased odds of negative mental health outcomes and self-harm in LGBTQ+ people [23–25]. While these findings relate to the wider LGBT population, they suggest efforts to reduce LGBT-specific risk factors, like victimisation, may reduce self-harm by reducing depression and hopelessness. This may also be the case with TGD people. Indeed, Price-Feeney et al. [25] suggest reducing TGD-specific factors (such as discrimination) is likely to reduce the disparity between self-harm and negative mental health experienced by TGD people.

Additionally, protective factors may mitigate TGD self-harm risk. Evidence suggests social and family support, reduced transphobia, TGD-safe schools or colleges, and having gender-appropriate documentation act as potential buffers against self-harm risk in TGD people [4,7,21]. Indeed, studies have found school and peer support were associated with reduced self-harm in both LGBT [16] and TGD [7] populations. Furthermore, these protective factors are also associated with reduced sexual and intimate-partner violence in TGD people [7]. Worryingly, TGD people experience high rates of these events [7], and they are known risk factors for self-harm in TGD people [4]. Therefore, efforts to increase support for TGD people in school and wider social contexts may provide a protective buffer against self-harm, and correlating risk factors. Similarly, other studies have found family [7] and parental [21] support and feeling connected to parents and non-parental adults [4] offered protection against self-harm outcomes. These protective factors may also have mediation effects on other protective factors. For example, having parents who are supportive of one's preferred gender may facilitate access to gender-seeking surgery or obtaining gender-appropriate documentation [21], which, in turn, provide a buffer against self-harm. However, the literature regarding protective factors in TGD people is limited [4], therefore the protective impact of these, and other, protective factors on TGD self-harm is unclear. Simultaneously experiencing both general and TGD-specific risk factors may result in TGD people being at increased risk of experiencing self-harm [12,13]. Furthermore, interactions between risk and protective factors may result in a unique pathway to self-harm in TGD people [4]. Examining correlates of self-harm in TGD people is necessary to ascertain why TGD people are at increased risk of self-harming behaviours [12]. Synthesising extant literature and identifying key factors for TGD self-harm is important to identify meaningful and TGD-appropriate targets for intervention, develop interventions aimed at reducing self-harm prevalence [12], and develop intervention and support strategies which reduce self-harm in TGD and associated negative outcomes [12] in this high-risk group.

Previously, TGD self-harm has been researched under the LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual, and other gender identities/sexualities [22]) umbrella [12,16,24]. This conflation is problematic as TGD people are often under-represented in these studies or TGD-specific data is not extractable [24]. Interventions targeting TGD people may be inadequate because factors influencing TGD self-harm differs from others within the LGBTQIA + umbrella. Indeed, research to better understand the distinct TGD self-harm pathway is essential and recommended by researchers in the field [4,25,26]. Others have provided reviews of self-harm in TGD people [6,27]. However, these reviews focus on prevalence rates rather than identifying factors which may provide important intervenable targets. A recent scoping review found promising evidence of the protective function of peer support against self-harm and suicide in TGD people [28]. However, self-harm pathways are complex and multifaceted. Currently, there is no systematic review of self-harm risk and protective factors in TGD people: the current review fills this gap in knowledge to inform TGD-specific research and interventions to increase understanding of the TGD self-harm pathway and increase wellbeing of this

high-risk group [26]. Identifying viable targets for intervention is key for researchers and clinicians [28].

1.1. Aims

Considering the paucity of research on risk and protective factors for self-harm in TGD populations our systematic review aims to critically examine and synthesise existing literature regarding risk and protective factors associated with self-harm in TGD people.

2. Method

2.1. Protocol and registration

This review was conducted in accord with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis reporting guidelines (PRISMA [29,30]) and is registered on PROSPERO: CRD 42023396437. The protocol was developed in line with the Cochrane Handbook for Systematic Reviews [31].

2.2. Search strategy and selection criteria

Scoping searches identified relevant search terms and discussion between authors finalised search terms. Then, two authors (KB and LM) independently performed searches of PubMed, PsychInfo, Scopus, MEDLINE, and Web of Science databases. Searches were completed on November 6, 2023. Search terms included “self-harm”, “non-suicidal self injur*”, “suicid*”, “trans*”, and “gender divers*”. Full search terms appear in Appendix 1. Studies were included if participants self-identified as TGD (including identities under that umbrella term; see Appendix 2.) with current or past self-harm and/or suicidality, and if they examined risk and/or protective factors for self-harm behaviours (see Table 1 for full inclusion/exclusion criteria). Eligible studies were imported into Endnote [32], the reference management system. Duplicates were removed, then studies were removed if they did not meet eligibility criteria. Titles and abstracts, and then full texts, were screened independently by two researchers (KB and LM). Independently, KB and LM extracted data, then cross-checked data extraction for accuracy. Extracted data included study details (author/s, date, study location), study design information (design type, recruitment method, self-harm outcome), participant characteristics (age, gender), measures used, and study findings. Discrepancies were resolved between KB and LM. Third author input was unnecessary.

2.3. Data synthesis

Search results are presented in Fig. 1. Due to significant heterogeneity of factors examined, we present a narrative synthesis of results of key risk and protective factors for TGD self-harm [6]. Study characteristics and findings were summarised in descriptive tabular format grouped by risk factors and protective factors, then further synthesised by TGD-specific and general factors.

3. Results

Of 8707 records identified, 8573 articles were screened by abstract. One-hundred and thirty-two articles had full texts screened. Overall, 78 studies were eligible for inclusion in this review (see Fig. 1 for PRISMA search results summary). A full list of excluded papers with reasons for their exclusion is available (see Appendix 3.) Full data extraction is available on request.

3.1. Study characteristics

Of 78 eligible studies, 68 were conducted in community settings, and 10 in clinical settings. Other key study (location, study design, risk and/or protective factors examined, self-harm outcomes, and key findings) and participant (*n*, gender identity, age-range, and

Table 1
Inclusion and exclusion criteria used in screening process.

Inclusion Criteria	Exclusion Criteria
English language peer-reviewed studies	Reviews, editorials, commentaries, or opinion pieces, grey literature, theses/dissertations, or conference proceedings
Any geographical location	Studies using parent/caregiver report
No start or end dates were used	Studies investigating self-harm or suicidality in TGD veterans or prison inmates
No age restrictions	
Only quantitative empirical studies	
Cross-sectional, longitudinal, cohort and mixed methods studies	
Measured outcome of self-harm (irrespective of suicidal intent), suicide ideation, and/or suicide attempt (attempt on own life or completed suicide)	
Studies must investigate risk and/or protective factors for self-harm in Transgender and Gender-Diverse (TGD) people	
Participants self-identifying as TGD (including diverse gender identities; see appendix 1	

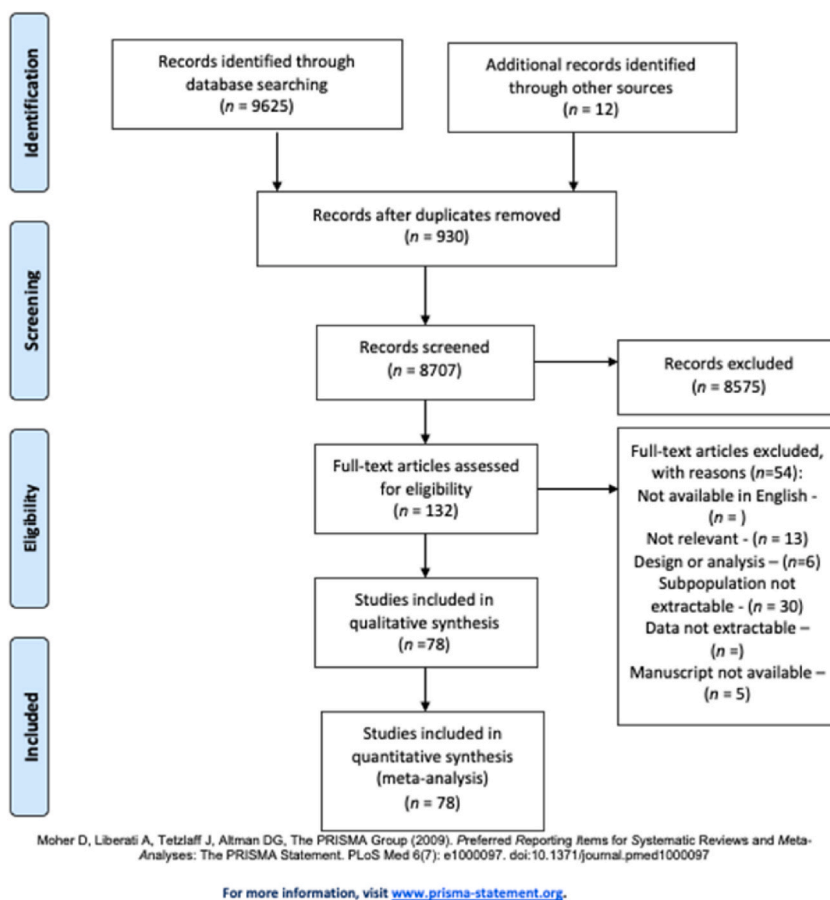


Fig. 1. Flow diagram illustrating literature search process.

mean ages) characteristics are presented in Table 2.

3.2. Sample characteristics

Participants included across studies totalled 322,144. Participant numbers in individual studies ranged from 16 to 27,715 ($M = 4077.78$, $SD = 12,770$). Ages ranged from 7- to 98-years. The combined mean age from studies, including participants' mean age at baseline, was $M = 27.73$ ($SD = 7.40$). Other sample characteristics are included in Table 2.

3.3. Measures of risk and protective factors

Most studies used validated measures of risk and/or protective factors, though measures varied significantly. However, we found little evidence many measures were validated in TGD populations which may be problematic if they cannot sufficiently capture TGD specific issues [8]. For example, ten studies used the Patient Health Questionnaire (PHQ) for Depression [66,104,62,84,88,67,70,59,59,85] but there is no evidence PHQ is validated in TGD populations, meaning PHQ may not reliably assess depression in TGD people. This may be the case with other measures used by studies in this review. Some measures were validated in TGD populations, so are appropriate to capture TGD experiences. Perhaps unsurprisingly, these were TGD-specific measures (e.g., Gender Minority Resilience Model [39,67,91,79,43,51–53,59]; Transgender Congruence Scale [13,43]; Transgender Identity Survey [78]; Hamburg Body Drawing Scale [55,50]). See Table 2 for full list of risk and protective factor measures used across all studies.

3.4. Assessment of methodological quality

Bias risk and methodological quality were assessed using the Newcastle-Ottawa Scale adapted for cross-sectional studies [105], case-control and cohort studies [106]. These assess bias risk in three areas: participant recruitment/selection, participant comparability, and outcome. Studies are awarded a maximum of 9-(cohort and case-control) or 10-points (cross-sectional). Studies are rated high (7–10 points), moderate (4–6 points), or low. (0–3 points) quality. These quality categories have been used in previous systematic

Table 2
Summary of study and sample characteristic and findings.

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Arcelus et al. (2016) [11] (UK)	Cross-sectional	n = 268 Natal female: 45.2% Natal male: 50.7% Did not answer: 4.1% Age range: 17–25 years (M = 19.9)	Demographics Psychopathology: SCL-90; Self-esteem: RSE; Transphobia victimisation: Experiences of Transphobia Scale; Interpersonal functioning: IIP-32; Social support: MSPSS	NSSI: SIQ	<ul style="list-style-type: none"> Natal sex (female) & severity of clinical symptomology significantly associated with NSSI Transphobia, low self-esteem & interpersonal problems significant predictors of psychopathology levels which is a risk factor for NSSI
Almazan et al. (2021) USA [33]	Cross-sectional	n = 27,715 Trans woman: 38.3% Trans man: 29.1% Nonbinary: 30.2% Cross-dresser: 2.5% 18+ (not provided)	Demographics Severe psychological distress: K-6; Past-month binge alcohol use & past year tobacco smoking: all 1-item	Past-year suicide ideation & suicide attempt measure not provided	<ul style="list-style-type: none"> Exposure to gender-affirming surgery significantly associated with reduced past-year suicide ideation, but not past-year suicide attempts Participants with all desired surgeries had significantly reduced suicide ideation & attempts
Andrew et al. (2020) [34] (USA)	Cross-sectional	n = 155 Non-binary: 25.2% (no further breakdown provided) AFAB: 75.5% Age range not provided (M = 29.86)	Demographics Trauma exposure: Life Events Checklist; Nightmares: Trauma-Related Nightmare Survey; PTSD: PTSD checklist for DSM-5	Suicide risk: SBQ-R	<ul style="list-style-type: none"> Nightmare frequency significantly associated with increased suicide risk Nightmare severity was not significantly associated with suicide risk
Austin et al. (2022) [35] (USA & Canada)	Cross-sectional	n = 372 Trans man: 89.2% Non-binary/gender fluid: 32.8% Man: 9.4% Trans Woman: 11.6% Woman: 3.2% Demiboy: 1.1% Transgender: 0.3% Other: 0.8% Two-Spirit: 0.5% * NB these categories are not mutually exclusive* 14–18 years (M = 15.99)	Demographics LGBTQ-related stigma: 5-items from NHAI; Interpersonal & environmental LGBTQ microaggressions: Interpersonal LGBTQ Microaggressions subscale & Environmental LGBTQ Microaggressions subscale (adapted from LGBQ Microaggressions On-Campus Scale)	Suicidality: 2-items from DSM-5	<ul style="list-style-type: none"> Interpersonal microaggressions significantly associated with suicide attempts Familial emotional neglect, reduced school belonging & internalised self-stigma significantly associated with past 6-months suicidality Reduced school belonging associated with past 6-months suicidality but not lifetime suicide attempts Internalised stigma associated with suicide ideation but not suicide attempts
Azeem et al. (2019) [36] (Pakistan)	Cross-sectional	n = 156 Transgender Age range not provided (M = 39.26)	Demographics Depression: Hamilton Rating Scale for Depression Self-reported family income, illicit substance use and smoking: measures not provided	SI: Scale for Suicide Ideation	<ul style="list-style-type: none"> Illicit substance use and depression significantly associated with suicide ideation Age, smoking, and family income not significantly associated with suicide ideation
Barboza et al. (2016) [37] (USA)	Cross-sectional	n = 350 Transgender MTF: 62% FTM: 35% Age range not provided	Demographics Victimisation: 2 items; Substance use: 1 item covering 10 illicit substances; Family social support & Counselling or psychotherapy use: both 1-item	Suicidal Risk: 2 items	<ul style="list-style-type: none"> Discrimination significantly associated with increased odds of suicide attempts Non-discriminatory physical victimisation significantly associated with increased odds of suicide ideation & attempts Being white, lower levels of perceived family support,

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Basar & Oz (2016) [38] (Turkey)	Cross-sectional	n = 116 Trans men: 75.9% Trans women: 24.1% Median: 25-years	Demographics Discrimination: PDS; Depression: BDI Resilience: RSA; Social support: MSPSS	Suicide attempt history; NSSI: ascertained by clinical interview	<ul style="list-style-type: none"> lack of psychological counselling/psychotherapy for TGD-related services, & past alcohol problems significantly associated with increased odds of suicide ideation & attempts Housing instability significantly associated with increased suicide attempt risk Higher education levels marginally associated with suicide ideation Reduced resilience (lower RSA score) significantly associated with suicide attempt history but not NSSI
Bauer et al. (2016) [21] (Canada)	Cross-sectional	n = 380 Transgender MTF: 52.6% FTM: 47.4% 16+ (M = 32.7)	Demographics Chronic illness/pain, immigration history, religious upbringing, childhood abuse & mental health disorders: self-reported; Transphobia: Experiences of Transphobia Scale; Transphobic harassment & violence; medical transition status, hormone use, social transition status, being perceived as cisgender: self-reported; Social support: Medical Outcomes Study Social Support Scale	Past year suicide ideation & attempts: dichotomous scale	<ul style="list-style-type: none"> Social support, reduced transphobia, medically transitioning though hormones/surgery, & having personal identification documents changed to appropriate/preferred sex were significantly associated with reductions in suicide risk Parental support for gender identity was significantly associated with reduced suicide ideation Lower self-reported transphobia associated with decrease in suicide ideation & suicide attempts Religiosity & spirituality AND gender support from other sources except parents were not significantly associated with reduced suicidality
Brennan et al. (2017) [39] (USA)	Cross-sectional	n = 83 Trans women/MTF: 40% Trans men/FTM: 29% Various gender nonconforming identities: 31% 19–70 years (Not provided)	Demographics Depression: CES-D; Anxiety: Becks Anxiety Inventory; Gender Minority Stress: GMSR	Suicide ideation, suicide attempts & NSSI: dichotomous scale	<ul style="list-style-type: none"> < 40 years more likely to have NSSI than >40 years Distal stress (gender-related discrimination, gender-related rejection, gender-related victimisation, & non-affirmation of identity) weak positive predictor of suicide attempts Resilience factors (pride & community connectedness) were marginal negative predictors of suicide attempt Distal stress had weak positive relationship with suicide ideation NSSI: age had moderate negative relationship Suicide ideation: age had moderate positive relationship

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Becerra et al. (2021) [40] (USA)	Cross-sectional	<i>n</i> = 1369 Transgender 18+ (Not provided)	Demographics Psychological distress: K-6; Abuse/violence: 4-items; Partner abuse/violence: 24-items; Harassment/abuse due to bathroom use: 3-items	SI & SA: 4 questions with Y/N responses	<ul style="list-style-type: none"> Abuse, violence, sexual partner abuse/violence are significantly associated with suicidal thoughts and behaviours Harassment & abuse while using the bathroom is significantly associated with suicide attempts
Bosse et al. (2023) [41] (USA)	Cross-sectional	<i>n</i> = 286 Transgender and Nonbinary 18–25 years (M = 21.5)	Demographics Parental acceptance-rejection: Parental Acceptance-Rejection Questionnaire; Sibling acceptance-rejection: Elder Sibling Acceptance-Rejection Questionnaire; Depression: CES-D	Suicidality: 1 item for suicide ideation, planning & attempts	<ul style="list-style-type: none"> No significant relationship between race, ethnicity, ASAB, whether living with parent & suicidality Older age significantly associated with fewer lifetime suicide planning and attempts Higher education significantly associated with fewer lifetime suicide plans and attempts & past year suicide ideation & attempts Higher family rejection significantly associated with increased lifetime and past year suicidality High sibling rejection was not associated with past year suicide attempts Rejection from male parent particularly significant
Budhwani et al. (2018) [42] (Dominican Republic)	Cross-sectional	<i>n</i> = 298 Transgender women Age range not provided (M = 26)	Demographics Sexual abuse, psychological abuse, torture, attempt on own life by another: dichotomous Y/N; Depression: 1 item; Illicit drugs: Dichotomous Y/N (in past 6-months); Income & education level: self-report	Suicide attempts: dichotomous Y/N	<ul style="list-style-type: none"> Psychological abuse, torture & experiencing a murder attempt significantly associated with suicide attempt Experiencing psychological abuse increases suicide attempt risk 3-fold Experiencing torture or a murder attempt almost 3x more likely to attempt suicide Depressed transgender women were 4x more likely to attempt suicide Transgender women who used illicit drugs were 2x more likely to attempt suicide Experiencing sexual abuse not associated with higher odds of suicide attempt compared to non-attempters Low monthly income, age, & low education attainment not significantly associated with suicide attempt
Burish et al. (2022) [43] (USA & Canada)	Cross-sectional	<i>n</i> = 139 Transgender or nonbinary 18+ (M = 33.78)	Demographics Gender Minority Stress: GMSR Social Support: Perceived Social Support Scale from Family &	Suicidality: SBQ-R	<ul style="list-style-type: none"> Optimism emerged as a significant protective factor Body acceptance was a significant protective factor (and it predicted optimism)

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Busby et al. (2020) [44] (USA)	Cross-sectional	n = 868 (n = 86 identified as transgender) 18+ (Not provided)	Friends Scale; Optimism: LOT-R; Body Acceptance & Congruence: Transgender Congruence Scale Demographics Depression: PHQ-9; Discrimination: EDS; Interpersonal Victimisation: Interpersonal Victimisation Scale-Revised; Social Connectedness: UCLA Loneliness Scale; LGBTQ Affirmation: 3-items from LGBTQ Identity Affirmation Scale (modified from original 12-item scale)	Past year suicide ideation; lifetime suicide attempts; NSSI: 1 item from the Youth Risk Behavior Survey	<ul style="list-style-type: none"> • Social support, community connectedness & pride were not significant protective factors • Victimisation, discrimination, connectedness, & LGBTQ affirmation were not significantly related to suicide and NSSI outcomes for transgender students • Some results were under wider LGBTQ umbrella so impossible to extract transgender-only data
Campbell et al. (2023) [45] (USA)	Cross-sectional	n = 1078 gender-conversion treatment n = 24,192 control Transgender 11–17 years when gender conversion efforts began (Not provided)	Demographics Gender conversion efforts: 1 item	Suicide attempts: dichotomous Y/N & number of attempts	<ul style="list-style-type: none"> • Exposure to gender conversion therapy is significantly linked with increased risk of SA in adolescents
Cerel et al. (2021) [46] (USA)	Cross-sectional	n = 2784 27.3% transgender female 27% transgender man 38.7% non-binary 1.2% transgender unspecified 5.7% transgender other 18+ (M = 34.35 suicide exposure; M = 31.33: no suicide death exposure)	Demographics Suicide attempt exposure, support from family of origin, mental health diagnosis, being a POC, gender binary status & gender identity: all self-reported	Past year suicide ideation & attempts: 4-items with dichotomous Y/N	<ul style="list-style-type: none"> • Exposure to suicide attempts & suicide increases likelihood of recent suicide ideation, recent & lifetime suicide attempts, lifetime NSSI, & at least one current mental health diagnosis • Exposure to the suicide attempt of a TGD person increased suicide ideation but not suicide attempts • Exposure to suicide attempts & suicide more closely correlated with suicide ideation than suicide attempts • NSSI history, female natal sex, younger age, & lacking family support & exposure to suicide attempts & suicide were associated with suicide ideation & attempts • Being white, NSSI history, & lacking familial support differentiated those with suicide ideation from those with suicide attempt in people exposed to suicide attempt and suicide
Chen et al. (2019) [47] (China)	Cross-sectional	n = 1309 Transgender men: n = 622 Transgender women: n = 687 Age range not provided (Transgender men M =	Demographics Feelings towards natal sex, seeking hormone therapy, seeking gender reassignment surgery, intense conflicts with parents regarding	Self-harm, suicide ideation & suicide attempts measured using dedicated items (not specified)	<ul style="list-style-type: none"> • Regarding suicide ideation: • Transgender men: disliking natal sex, seeking gender reassignment surgery, depression, risk for major depressive disorder, self-

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
		3.78; Transgender women M = 22.89; Overall M = 23.31)	sexuality, discrimination or violence in public due to sexuality, childhood adversity (incl. Bullying and insults at school), Seeking MH support services & history of major depressive disorder: all measured using unspecified measures Depression: CESD-9; Self-esteem: RSE		<p>harm, seeking mental health services all significantly predicted increased risk of suicide ideation</p> <ul style="list-style-type: none"> • Transgender women: disliking natal sex, current or past major depressive disorder, depression, risk for major depressive disorder, self-harm, seeking mental health support services all significantly predict increased suicide ideation risk • ALL: disliking natal sex, seeking gender reassignment surgery, intense conflicts with parents, current or past major depressive disorder, depression, risk for major depressive disorder, self-harm, & seeking mental health services all significantly increased suicide ideation risk • Regarding suicide attempts: Transgender men: Experiencing violence and/or discrimination in public, current and/or past major depressive disorder & self-harm all significantly. Predicted increased suicide attempt risk • Transgender women: Being separated/divorced, current or past major depressive disorder, and self-harm all significantly predicted suicide attempt risk increase • ALL: Education level high school or equivalent, being married, being separated/divorced, intense conflicts with parents, self-harm & seeking mental health services all significantly predicted increased suicide attempt risk • No significant relationship between self-esteem, & self-harm & suicide • Lack of residential status, bisexuality, homelessness before age 18, experiences of verbal, physical, or sexual violence, alcohol use, & severe mental health disorders were all significantly associated with suicide ideation & and prior suicide attempts • Moderate or severe psychological distress were
Chen et al. (2020) [48] (China)	Cross-sectional	n = 250 Transgender women 18+ (M = 27.9)	Demographics Anxiety & depression: K-10 Discrimination (incl. Verbal abuse), mental health status, PTSD screening, access to mental health services, alcohol & drug use, physical abuse, harassment (restricted personal freedom,	Suicide ideation & attempts: dichotomous Y/N	<ul style="list-style-type: none"> • Lack of residential status, bisexuality, homelessness before age 18, experiences of verbal, physical, or sexual violence, alcohol use, & severe mental health disorders were all significantly associated with suicide ideation & and prior suicide attempts • Moderate or severe psychological distress were

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
			economic control due to gender identity), sexual violence: all dichotomous Y/N		associated with prior suicide attempts <ul style="list-style-type: none"> • Suicide ideation was strongly correlated with severe psychological distress • Moderate or severe psychological distress was significantly associated with prior suicide attempt
Chinazzo et al. (2023) [49] (Brazil)	Cross-sectional	n = 213 Transgender boys/men: 48.6% Transgender girls/women: 20.8% Non-binary: 30.7% 13–25 years (M = 18.53)	Demographics Depression: MDS; Discrimination: Lifetime & Daily Discrimination Subscale; Gender Distress: TYC-GDS; Socioeconomic Status: Deprivation Scale Social Support: MSPSS; Social Support relating to gender identity: 1 item; Gender Positivity: Gender Positivity Scale	Suicide ideation & attempts: dichotomous Y/N	<ul style="list-style-type: none"> • Socioeconomic deprivation & depressive symptoms significantly associated with suicide ideation & attempts • No significant relationship between discrimination & suicide ideation & attempts • Gender distress associated with suicide ideation (binary transgender people experience higher distress than nonbinary people) • Gender positivity a significant protective factor & may counteract gender distress • Social support & support relating to gender were non-significant (friends' support for gender identity, affective support, positive social interaction support, and emotional/information support)
Claes et al. (2015) [50] (UK)	Cross-sectional	n = 155 Transgender men: n = 52 Transgender women: n = 103 17–77 years (M = 34.52)	Demographics Psychological Symptoms: SCL-90-R; Body Dissatisfaction: HBDS; Transphobia/victimisation: Experiences of Transphobia Scale; Interpersonal Problems: IIP-32 Perceived Social Support: MSPSS; Self-Esteem: RSE	NSSI: SIQ	<ul style="list-style-type: none"> • NSSI significantly associated with younger age (M_{age} = 26.98 vs. M_{age} = 38.91) • Transgender males are significantly more likely to SH than Transgender women (57.7% vs 26.2%) • Psychological/clinical symptomology significantly associated with NSSI • Transgender women report lower self-esteem, but this is not significantly related to NSSI • Transgender women reported significantly more body dissatisfaction but not significantly related to NSSI • Transphobia, interpersonal problems not significantly related to NSSI • Trans people with NSSI reported finding it harder to be assertive & sociable & were more aggressive • Transgender men received more social support but not significantly related to NSSI, though people with

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Cogan et al. (2020) [51] (USA)	Cross-sectional	<i>n</i> = 155 Various gender identities 18–67 years (M = 29.86)	Demographics Gender minority stress: GMSR; Traumatic experiences: Life Events Checklist for DSM-5	Suicide risk: SBQ-R	<p>NSSI reported less family support</p> <ul style="list-style-type: none"> • NSSI significantly associated with younger age, being male, and reporting more psychological symptoms • Gender minority stressors (discrimination, gender-related rejection, gender-related victimisation, non-affirmation of gender identity, internalised transphobia, negative expectations of future events, concealment) and trauma are significantly associated with suicide risk • Community resilience specified in GSMR (community connectedness, pride) did not significantly mitigate suicide risk nor did it moderate relationships between stressors & risk
Cogan et al. (2021a) [52] (USA)	Cross-sectional	<i>n</i> = 29.86 Various gender identities 18–67 years (M = 29.86)	Demographics Traumatic experiences: Life Events Checklist; Gender Minority Stressors: GMSR	Suicide risk: SBQ-R	<ul style="list-style-type: none"> • Proximal stressors (internalised stress, internalised transphobia, negative expectations due to gender identity, concealment of gender identity) were all significant predictors of suicide risk • Sexual violence was a significant predictor of suicide risk
Cogan et al. (2021b) [53] (USA)	Cross-sectional	<i>n</i> = 29.86 Various gender identities 18–67 years (M = 29.9)	Demographics Lifetime Trauma Exposure; LEC-5; Distal gender minority stressors: GMSR	Suicide risk: SBQ-R	<ul style="list-style-type: none"> • Distal stressors (gender-related discrimination, rejection, victimisation & nonaffirmation) were significantly associated with suicide risk & related to proximal stressors (internalised transphobia, negative expectations for future events, and concealment) • Proximal stressors (internalised stress, internalised transphobia, negative expectations due to gender identity, concealment of gender identity) also significantly related to suicide risk
Cramer et al. (2016) [54] (UK)	Cross-sectional	<i>n</i> = 27,658 Various gender identities 18+ (not provided)	Demographics Interpersonal correlates (HRD: family rejection, childhood harassment, rejection, discrimination); HRD in workplace, healthcare settings, health insurance; TGD-related	Suicidal thoughts & behaviours: 4-items with dichotomous	<ul style="list-style-type: none"> • Family rejection, childhood harassment, rejection & discrimination (HRD), workplace HRD, healthcare HRD & sexual assault were all significantly associated with suicide ideation & attempts

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
			physical assault, lifetime TGD-related intimate partner abuse; sexual assault; connection to TGD community; family support & co-worker support: measures not specified		<ul style="list-style-type: none"> • Past year health insurance HRD, past year TGD-related physical assault & lifetime intimate partner violence were all significant associated with suicide attempts, but not suicide ideation • Family & co-worker support were significantly correlated with reduced suicide attempts, but not suicide ideation • Marginalized status (sexual, racial & disability linked to suicidal thoughts & behaviours risk • Discrimination & victimisation were significantly associated with past year suicide attempts • Being less out with TGD identity was a protective factor • Sexual minority, racial minority, lower education, lower income, military experience, disability status, & being uninsured were significantly associated with past year suicidal thoughts & behaviours risk
Davey et al. (2016) [55] (UK)	Cross-sectional	n = 97 Control: n = 97 60 Transgender women 37 Transgender men Control: 60 cisgender women 37 cisgender men Age range not provided (Transgender: M = 36.18; Control M = 37.16)	Demographics, incl. Civil status, living situation TGD people were asked for treatment stage & hormone status; General Psychopathology: SCL-90-R Self-Esteem: RSE; Body Satisfaction: HBDS; Perceived Social Support: MSPSS	NSSI: SIQ-TR	<ul style="list-style-type: none"> • TGD group had significantly higher prevalence of current NSSI than control group • TGD men had significantly higher prevalence rates of current NSSI than TGD women • TGD NSSI group (TGD individuals reporting current NSSI) reported significantly higher psychopathology, lower self-esteem, lower body satisfaction & social support compared to the TGD no NSSI group & cisgender no NSSI group • TGD people with NSSI were significantly younger than both other groups (cisgender & TGD no NSSI)
de Graaf et al. (2020) [56] (Canada, UK, Netherlands)	Cross-sectional	n = 2771 Natal male: n = 937 Natal female: n = 1834 13+ (M = 15.99)	Demographics, incl. age at assessment, year of assessment, full-scale IQ, parents' marital status, & parents' social class IQ: Wechsler Intelligence Scale for Children & Wechsler Adult Intelligence Scale; Parent social status/ education:	Suicidality = Item 18 from CBCL & Item 91 from YSR	<ul style="list-style-type: none"> • Natal sex (female) & behavioural & emotional problems were consistent predictors of suicidality across clinics & measures used • CBCL: Toronto-Amsterdam contrast: clinic, birth assigned sex, parents' marital status & social class, & general emotional &

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
			Hollingshead's Four-Factor Index of Social Status (non-validated scale); Items from the CBCL & YSR were used to measure desire to be the opposite sex, poor peer relations & behavioural problems		behavioural problems were all significant predictors of suicidality <ul style="list-style-type: none"> • Toronto-London contrasts: clinic, birth assigned sex, & general behavioural & emotional problems were all significant predictors of suicidality • Amsterdam-London contrast: clinic, birth assigned sex, & general behavioural & emotional problems were all significant predictors of suicidality • YSR: Toronto-Amsterdam: birth assigned sex, poor peer relations, & general emotional & behavioural problems were significant predictors of suicidality • Toronto-London: clinic & behavioural & emotional problems were significant predictors of suicidality • Amsterdam-London: clinic & general behavioural & emotional problems were significant predictors of suicidality • Mixed findings regarding parent's marital status & social class depending on scale (results were significant on CBCL, but not for YSR)
dickey et al. (2015) [57] (USA)	Cross-sectional	n = 773 Various gender identities Age range not provided (M = 34.5)	Demographics Depression & Anxiety: DASS-21; Feelings about body: BIS	NSSI: ISAS	<ul style="list-style-type: none"> • Depression, anxiety & stress were significantly associated with NSSI • NSSI significantly associated with lower BIS scores (i.e., lower body image)
Drescher et al. (2021) [58] (USA)	Cross-sectional	n = 70 Transgender men: 43.4% Transgender women: 25.7% 4 Non binary: 40% 18-65 (M = 29.97)	Demographics Homelessness & perceptions about safety: 1-item (these were adapted from the LGBT Health & Services Needs in New York State study & Seattle LGBT Commission 2010 Needs Assessment Survey respectively) Physical violence & sexual violence victimisation: 3-items	Suicidality (ideation & attempts): Dichotomous Y/N	<ul style="list-style-type: none"> • Suicide ideation was significantly associated with history of sexual violence, homelessness, & perceived lack of CSRA safety (safety in local area) • Suicide attempts were significantly associated with sexual violence history, homelessness, & perceived lack of CSRA safety (safety in local area) • Partner violence was not significantly associated with suicide ideation or attempts • No demographic (age, gender identity, ethnicity, household income, education attainment level, & current financial situation) characteristics

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Drescher et al. (2023) [59] (USA)	Cross-sectional	n = 115 Transgender Non-conforming 18+ (M = 27.61)	Demographic Depression: PHQ-9 Gender Minority Stressors/Resilience: GMSR Emotion Dysregulation; DERS-SF	Suicide intent & risk: SHI	were significantly associated with suicide ideation or attempts <ul style="list-style-type: none"> Emotion dysregulation was significantly correlated with suicide ideation, suicide attempts, suicide intent, and risk Victimisation was significantly associated with suicide ideation, suicide attempts, suicide intent, and risk Rejection was significantly associated with suicide ideation & suicide risk Discrimination was significantly associated with suicide risk only
Edwards et al. (2012) [60] (USA)	Cross-sectional	n = 106 Transgender women: 40.6% Transgender men: 32.1% Questioning: 7.5% Genderqueer: 2.8% Nonbinary/gender fluid: 1.9% Neutrois: 0.9% Trans: 0.9% Intersex: 0.9% Not provided: 12.3% 18–65 years (M = 29.17)	Demographics Emotional Stability: Inventory-25; Suicide Resiliency Relational Support: Perceived Social Support from Family (PSS-FA) and Friends (PSS-FR)	Suicide risk: SBQ-R	<ul style="list-style-type: none"> High levels of perceived support from friends & family significantly associated with their emotional stability which, in turn, was negatively associated with suicide risk Participants with higher levels of support experienced increased emotional stability which led to lower suicide risk Independently there was no relationship between perceived support & suicide risk
Goldblum et al. (2018) [61] (USA)	Cross-sectional	n = 290 Transgender 18–65 years (M = 37.01)	Demographics In-school gender-based victimisation: 2 items; Effect of gender-based victimisation: 1 item	Suicide attempt history: 2-item	<ul style="list-style-type: none"> Younger age (<45) significant associated with suicide attempts Transgender men significantly more likely to attempt suicide than transgender women Ethnicity was significantly associated with suicide attempts Multi-racial or 'other' were significantly more likely to attempt suicide, but White, African America, and Latina/o also reported high suicide attempt history Higher socioeconomic status was significantly associated with reduced suicide attempts compared to lower & middle status School-based gender-based violence was significantly associated with suicide attempts in transgender men and women
Gower et al. (2018) [62] (USA)	Cross-sectional	n = 2168 Natal female: 68.1% Natal male: 31.9% No age range provided but USA grades 5, 8, 9,	Demographics Parent connectedness: 3-item scale not validated; Youth Development Opportunities: 7-item	Suicide ideation and attempts: Dichotomous Y/N	<ul style="list-style-type: none"> Feeling connected to parents was associated with significantly lower odds of suicide ideation and attempts

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
		11 (ages 10–18) (M not provided)	scale from Developmental Assets Profile; Teacher student engagement: 4-items from Student Engagement Inventory; Feeling safe in community: 2-item scale not validated; School safety: 1-item scale not validated; Depression: PHQ-2; Alcohol, drug, cigarette use in past 30 days: Dichotomous Y/N Single items measured how much you feel other adult relatives, friends, & adults in the community care about you		<ul style="list-style-type: none"> • An increase in connectedness results in a one-unit reduction in odds of suicide ideation and attempts • Having caring adults in the community & feeling safe at school were associated with significantly lower odds of suicide ideation and attempts
Green et al. (2021) [63] (USA)	Cross-sectional	n = 11,914 Nonbinary: 63% Trans male: 29% Trans female: 8% 13–24 years (M = 17.62)	Demographics Depression: PHQ; Victimisation, Receipt of puberty blockers, & exposure to GICE: all 1-item Gender-affirming hormone therapy: 3 items with binary responses; Parent support for gender identity: 2 items	Suicidal thoughts & behaviours: 2 items from YRB survey	<ul style="list-style-type: none"> • Receipt of gender affirming hormone therapy was associated with significantly lower odds of past year suicide ideation & attempts • Gender affirming hormone therapy also significantly associated with lower rates of depression
Grossman & D’Augelli (2007) [64] (USA)	Mixed methods	n = 55 Trans female: n = 31 Trans male: n = 24 15–21 years (Trans female M = 17.5 Trans male M = 19.5)	Demographics Relation between suicide attempts & TGD status: RHA1; Lethality of suicide attempt determined by interviewer using lethality rating scale; Childhood Gender Nonconformity: GCS; Childhood Parental Abuse: Child & Adolescent Psychological Abuse Measure Body Esteem: Body-Esteem Scale for Adolescents & Adults	Suicide ideation: 3 items; Suicide attempts: Questions used in previous TGD suicide studies (cited) inc. whether drugs and/or alcohol was used at the time	<ul style="list-style-type: none"> • Childhood gender nonconformity was not significantly associated with suicide attempts • TGD-related suicide ideation, parental verbal abuse, parental physical abuse, lower body esteem (especially weight satisfaction & thoughts of how others evaluate one’s own body) were all significantly associated with suicide attempts • Sexual minority status was significant factor for life-threatening behaviours in TGD youth
Grossman et al. (2016) [65] (USA)	Longitudinal (First panel data)	n = 129 MTF: n = 44 (34%) FTM: n = 44 (31%) MTDG: n = 14 (11%) FTDG: n = 31 (24%) 15–21 years (M = 18)	Demographics Painful & provocative events components of IPTS: PPES	Suicide ideation & attempts: 2 parts of SHBQ Suicide ideation components of IPTS: INQ Capacity for self-harm components of IPTS: ACSS	<ul style="list-style-type: none"> • Regarding suicide ideation: • FTM & FTDG experienced increased suicide ideation compared to MTF & MTDG • White Caucasian group reported greater suicide ideation than other racial groups but no significant differences between Hispanic & non-Hispanic groups • Suicide ideation lower in people who attended religious services

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition &measure	Key findings
					<ul style="list-style-type: none"> • Perceived burdensomeness & thwarted belongingness were independently significantly associated with suicide ideation • Only perceived burdensomeness was significant in full model • Acquired capability to enact was not significantly associated with suicide ideation, but painful & provocative events were associated with greater acquired capability for lethal self-harm • Regarding suicide attempts: • FTDG identity was significantly associated with suicide attempts • Non-Hispanic & Caucasian youth significantly associated with suicide attempts compared to Non-Hispanic & Black/African American youth • Frequent religious service attendance was associated with fewer suicide attempts • Suicide ideation & acquired capability for self-harm was significantly associated with increased suicide attempts • Thwarted belongingness & perceived burdensomeness were both significantly associated with suicide attempts • Painful & provocative events were significantly associated with suicide attempts • No significant interaction effects between perceived belongingness & painful/provocative events or between perceived burdensomeness & thwarted belongingness • There was a significant interaction effect between thwarted belongingness & perceived burdensomeness & painful provocative events: thwarted belongingness had a significant positive association with suicide attempts only for those who experienced moderate amount of painful provocative events • Thwarted belongingness had no effect on those who

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Jackman et al. (2018) [13] (USA)	Cross-sectional (quantitative in-person interviews with survey)	n = 332 Transgender 16+ (M = 34.56)	Demographics Enacted stigma: EDS Felt Stigma: SCS; Transgender congruence: TCS Family support of TGD identity: 1-item; Friend support: 4-items from MSPSS; TGD community connectedness: 5-item subscale from GMSR	NSSI: SITBI	experienced almost no painful provocative events <ul style="list-style-type: none"> • Age, felt stigma, & trans congruence were significantly associated with past year self-harm • Each 1-year increase in felt stigma was significantly associated with an increase x 1 year was associated with a 2.33 increase in odds of past-year self-harm • Each increase of 1-year of age was associated with decreased odds of self-harm by factor of 3.23 • Enacted stigma & income were not significantly associated with increased past-year self-harm • Increase of one point on transgender congruence scale was associated with decreased odds of past-year self-harm by factor of 0.74 suggesting higher gender dysphoria levels associated with past year self-harm • Protective factors not significant
Kaplan et al. (2017) [66] (Lebanon)	Cross-sectional interview surveys	n = 54 Trans females 18–58 years (M = 27)	Demographics Depression: PHQ- & PHQ-9; General social support & social isolation: Items from Social Relationship Scale; Peer Support: 1-item regarding friends support of TGD identity; Gender identity openness: 2-items from RHS	Suicide ideation: 4-items; Suicide attempts: 2-items	<ul style="list-style-type: none"> • Suicide attempt history was significantly associated with lower general social support, lower social integration, lower peer support • Suicide attempt history was significantly associated with being more open about TGD identity in public & past or current hormone use • Depression was not significantly associated with suicide attempts. However, 55% of those who experienced a SA also experienced depression • History of sexual abuse & sex work was not significantly associated with suicide attempts • Education attainment, age, homelessness, & relationship status were not significantly associated with suicide attempts • Past & current hormone use were both significantly associated with suicide attempt history
Kaplan et al. (2020) [67] (Lebanon)	Longitudinal	n = 16 Trans women 22–50 years (Median = 26-years)	Demographics Sexual health & behaviour: 11-items measuring STI history; 13-items assessing sexual risk behaviour; & 23-	Suicidality: (thoughts, plans, & attempts ever & in past 3 months): Dichotomous Y/N	<ul style="list-style-type: none"> • Higher social cohesion was significantly correlated with reduced suicidal thoughts at 3-months post-test

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Klein & Golub (2016) [68] (USA)	Cross-sectional	n = 3458 Transgender & Nonconforming 19-98 (M = 36.69)	items measuring sexual relationship power; Mental Health (Anxiety & Depression): HADS; Depression: PHQ-9; PTSD: 4-item Primary Care PTSD Screen Family acceptance: 9-item measure of family acceptance; Lifetime trauma: 25-item Trauma History Questionnaire; Social Support: Social Cohesion Scale; GMSR & MDPSS; Gender affirmation, identity & expression: TGD specific Multigroup Ethnic Identity Measure, 6-items measuring gender typicality, & Outness Inventory; 31-items measuring desire/satisfaction of transition; 22-items measuring gender affirmation; 5-items measuring gender affirmation satisfaction; War exposure: War Event Questionnaire; Transphobia: 35-item scale (validated in population) Demographics Substance misuse: Dichotomous Y/N; Family rejection: 7-items	Lifetime history of suicide attempts: Dichotomous Y/N	<ul style="list-style-type: none"> Increased community connectedness was associated with reduced depression War event exposure was associated with higher anxiety
Kota et al. (2020) [69] (USA)	Cross-sectional	n = 928 Trans women 18-65 years (M = 35)	Demographics Perceived stigma: 4-items from RHM; Psychosocial impact of gender minority status: 4-items from TAIM; Depression: 6-items from BSI; Anxiety: 3-item subscale from BSI; Excessive drinking: 3-items; Non-inject drug use & Injection drug use: both 1-item; Intimate Partner Violence: 3-items; Sexual abuse: 3-items;	Suicide ideation: 2-items - 1 regards past-year suicide ideation & one whether this related to gender status	<ul style="list-style-type: none"> Younger age, binary gender identity, non-white race/ethnicity, lower education & income, & being unemployed were all significantly associated with suicide attempt history Family rejection also significantly associated with a history of suicide attempts Relationship between substance misuse & suicide attempts was not measured 33% reported suicide ideation Anxiety, perceived stigma of being transgender, the psychosocial impact of gender minority status, experiencing sexual abuse, family verbal abuse, & stranger verbal abuse were all significantly associated with higher odds of suicidal ideation Partner support was a significant protective factor

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Kuper et al. (2021) [70] (USA0)	Cross-sectional	n = 1896 Gender identity other than birth assigned sex: 78.1% AFAB 14-30 (M = -21.1)	Child Sexual Abuse: 1-item; HIV status: 1 item Demographics Gender related affirmation: 7-items; Gender-related self-concept: 7-items; Victimisation (Gender & Sexual Orientation-related): 6-items; Desire for gender-affirming medical care: 1-item; Depressive symptoms: PHQ-9; Social Support: Friend & family support: MSPSS;	Past year suicide ideation, attempts & suicide risk: SBQ-R Past year suicide attempts: binary variable modified SBQ-R	<ul style="list-style-type: none"> • Risk Factors: Region of USA & race/ethnicity were not significantly associated with suicide-related outcomes • Gender identity & sexual orientation were significantly associated with suicide ideation, attempts & positive suicide risk score • Gender-related victimisation & depressive symptoms were independently associated with suicide ideation, attempts & positive suicide risk score • Gender-related self-concept negativity was positively associated with suicide ideation & attempts • Sexual orientation-related victimisation was positively associated with suicide attempts • Queer identity was positively associated with suicide ideation • Pansexuality was positively associated with suicide risk • Protective Factors: Age was negatively associated with suicide ideation & attempts • Male identity & friend support were negatively associated with suicide attempts (i.e., acted as protective factors) • Family support was negatively associated with suicide ideation • Depression was significantly associated with NSSI • History of abuse (emotional, physical or sexual) was significantly associated with NSSI • Anxiety was non-significant • AFAB, transmasculine, mood disorder history, & abuse were significantly associated with NSSI • Age, race, ethnicity, social transition status, medical transition status, rural zip code residence, & nonmetro country residence were not significantly associated with a history of NSSI
Leon et al. (2021) [71] (USA)	Retrospective clinical data	n = 185 AFAB: 86.6% AMAB: 13.4% 7-25 years (Median at clinic enrolment: 16.3; Median at most recent clinic visit: 18.6)	Demographics Social transition; Medical transition; Mental health history (diagnoses, history of suicide ideation & attempts, psychiatric hospitalisation, history of abuse, bullying & victimisation) all captured from electronic medical records	Documented in medical records	<ul style="list-style-type: none"> • Depression was significantly associated with NSSI • History of abuse (emotional, physical or sexual) was significantly associated with NSSI • Anxiety was non-significant • AFAB, transmasculine, mood disorder history, & abuse were significantly associated with NSSI • Age, race, ethnicity, social transition status, medical transition status, rural zip code residence, & nonmetro country residence were not significantly associated with a history of NSSI

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Maguen et al. (2010) [72] (USA)	Cross-sectional	<i>n</i> = 153 Gender identity female: 25% Somewhat female: 20% Equally both: 25% Somewhat male: 24% Male: 6% 18+ (M = 47)	Demographics Mental Health Treatment: 3 items; TGD-related verbal abuse & physical violence: 2 items; IV drug use: 1 item;	Suicide attempts: Dichotomous Y/N & number of attempts	<ul style="list-style-type: none"> • Age & sex assigned at birth (female) were significantly correlated with past suicide attempts • Younger individuals were more likely to report attempted suicide • Psychiatric hospitalisation, ASAB (female) & TGD-related violence were all significantly associated with suicide attempts • Intravenous drug use was non-significant
Mak et al. (2020) [73] (USA)	Retrospective medical record	<i>n</i> = 6327 Trans men: 2875 (45%) Trans women: 3452 (55%) 3-45 (age groups: 3-17, 18-25, 26-35, 36-45, >45)	Demographics Mental health diagnoses as stated on EMR: incl. anxiety disorders, ADHD disorders, ASD, bipolar disorders, depressive disorders, schizophrenia spectrum disorders, substance use/abuse, conduct/disruptive disorders, eating disorders, dementia, other psychoses, & personality disorders	Suicide Attempts: Emergency Medical Records (as defined by ICD-9 or ICD10) Suicide Ideation: Binary variable: Ever or never	<ul style="list-style-type: none"> • Suicide ideation & attempts were 2-5 times higher for those with 1-2 mental health diagnoses • Suicide attempts were 7 times higher in those <18 than >45 years of age • Past suicide ideation & attempts were associated with 3 times increased likelihood of suicide attempts • No difference between trans men & trans women regards suicide attempts
Maksut et al. (2020) [74] (USA)	Cross-sectional	<i>n</i> = 381 Trans women 15-29 (not provided)	Demographics Perceived, anticipated & enacted stigma (related to TGD status): Gender Identity Stigma Scale; Sexual behaviour stigma: Sexual Behavior Stigma Scale; Severe Psychological Distress: Kessler Scale	Suicide ideation & attempts: 1-item each	<ul style="list-style-type: none"> • Suicide ideation was significantly associated with lower income, bisexual, pansexual, queer & asexual sexualities • Suicide ideation was significantly associated with discriminatory comments from family, verbal harassment & family exclusion • Suicide ideation was significantly associated with being poorly treated in a healthcare facility, verbal harassment, & rape • Suicide attempts were significantly associated with younger age, not living in urban/suburban area (i. e., rural), rejection by friends, feeling unprotected by police, & avoiding healthcare services • Being poorly treated in a healthcare facility, being blackmailed, & hearing gossip from healthcare workers were significantly associated with suicide attempts
Marx et al. (2021) [75] (USA)	Cross-sectional	<i>n</i> = 610 Transgender & gender nonconforming 14-18 years (M = 15.81)	Demographics Sexual victimisation: 1-item; Sexual harassment victimisation: 1-item; Bias-based peer	Suicide ideation: 1-item	<ul style="list-style-type: none"> • Sexual victimisation, sexual harassment victimisation, drug use, & bias-based peer victimisation were all significantly associated with suicide ideation

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Moody & Smith (2013) [76] (Canada)	Cross-sectional	n = 134 Man/boy: 37.6% Woman/girl: (37.6% Trans: 50.4% Transgender (51.1% Transsexual/ transsexual: 45.1% FTM: 27.1% MTF: 29.3% On FTM Spectrum:15% On MTF Spectrum:17.3% Genderqueer: 24.8% Two-spirit: 7.5% Transman: 24.8% Transwoman: 30.8%) Man of trans experience: 8.3% Woman of trans experience: 7.5% Androgyne: 8.3% Woman, boy, gender blender, bi-gender, polygender, pangender, cross- dresser, transvestite, intersexual, drag king: 30.4% Other (gender bent, third gender, gender fucker, trans woman):10.6% (participants may be in multiple categories) 18–75 years (M = 36.75)	victimisation: 1- item; Problematic drug use: 6- items Parental monitoring & support: 7-items; School belonging: 6-items Demographics Optimist; LOT-R; Social support: PSS-FR & PSS-Fa; Suicide resilience: SRI- 25; Reasons for living; RFL	Suicidal behaviours: SBQ-R	<ul style="list-style-type: none"> School belonging & greater parental support were negatively associated with suicide ideation (i.e., are protective factors) Perceived social support from family and friends, emotional stability, optimism, & child-related concerns (reason for living) were associated with lower suicidal behaviour scores indicating these factors provide some protection from suicidal thoughts and behaviours in TGD people Emotional stability (part of suicide resilience) was found to be a significant protective factor There were no significant differences in suicidal behaviours between FTM or MTF people
Parr & Howe (2019) [77] (USA)	Mixed-methods (Cross-sectional survey data included in this review)	n = 182 Trans female: n = 107 (26.6%)/Trans male: n = 75 (18.7)/ genderqueer/GNC: n = 44 (10.9%)/Other: n = 48 (11.9%) 14–65 years (not provided)	Demographics Identity nonaffirmation microaggression events: 3-items; Depression, acute sadness & loneliness: 2-items from SBQ-R	Past-year suicide ideation & lifetime suicide ideation & attempts: 2-items from SBQ-R	<ul style="list-style-type: none"> A 1x unit increase in frequency of identity nonaffirmation microaggression events was significantly associated with 2.54x increased odds of past year suicide ideation or 3.20x increased odds of lifetime suicide attempts A 1x increase in plausible values (as defined using latent logistic regression) reflecting TGD persons level of TGD identity was significantly associated with a 4.13x increase in odds of past year suicide ideation & 3.31x odds increase of lifetime suicide ideation or attempts Each unit increase of identity nonaffirmation or denial microaggression events reported were

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Perez-Brumer et al. (2015) [78] (USA)	Cross-sectional	n = 1229 Transgender: FTM n = 532; MTF n = 697 (but included multiple gender identities) Age & mean not provided	Demographics Structural Stigma: 4-item composite index based on gender minority measure; Internalised Transphobia: Transgender Identity Survey	Lifetime & past-year suicide attempts: 2-items	<p>significantly associated with a 1.39x increased odds of past year suicide ideation when adjusted for events which didn't impact social engagement</p> <ul style="list-style-type: none"> • A 1x increase in number of identity nonaffirmation events leading to feeling emotionally wearied or apathetic were significantly associated with a 21% increase odds of past year suicide ideation when adjusted for increases in events producing emotional pain • Increases in number of painning events were significantly associated with a 21% increase in odds of past year suicide ideation • MTF trans identity, being white, college education or higher (compared to high school or less education) were all significantly associate with decreased odds of lifetime suicide attempts • Higher levels of internalised transphobia were significantly associated with increased odds of lifetime suicide attempts • College or higher education was significantly associated with decreased odds of past-year suicide attempts • Higher level of internalised transphobia was associated with past year suicide attempts, but not statistically significant • MTF identity, being white, & attaining college education or higher were all significantly associated with fewer lifetime suicide attempts • Lower levels of structural stigma were associated with decreased odds of lifetime suicide attempts
Peterson et al. (2017) [26] (USA)	Retrospective chart review	n = 96 MTF: n = 54 MTF: n = 31 Gender fluid/nonbinary: n = 15 12–22 years (M = 17.1)	Demographics Psychosocial assessment at outset appointment: drug/alcohol use; history of legal problems/arrest; gang involvement; involved in fights; history of being bullied; feel safe at home; interest in weight change: All dichotomous Y/N;	Suicide attempt history; cutting or self-injurious behaviour history: Dichotomous Y/N	<ul style="list-style-type: none"> • Older age was significantly associated with increased likelihood of suicide attempts • Drive for weight change (weight gain & weight loss) was significantly associated with suicide attempt history • Self-harm history was significantly associated with suicide attempts

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
			Body image concerns: 1-item		<ul style="list-style-type: none"> FTM identity (compared to MTF) were significantly more likely to have suicide attempt & self-harm history Body dissatisfaction or body mass index (BMI) were not significantly linked to suicide attempts
Rabasco & Andover [79] (2020)	Cross-sectional	<p><i>n</i> = 96</p> <p>Transgender woman: <i>n</i> = 71</p> <p>Transgender man: <i>n</i> = 26</p> <p>Gender nonconforming: <i>n</i> = 8</p> <p>Gender queer: <i>n</i> = 9</p> <p>Other: <i>n</i> = 19</p> <p>12–22 years (<i>M</i> = 17.1)</p>	<p>Demographics</p> <p>Minority stressors: GMSR; Gender Identity State</p> <p>Policy Score</p>	Suicide ideation: BSS	<ul style="list-style-type: none"> Victimisation & discrimination separately were statistically significant predictive of lifetime suicide attempts Gender identity-specific state policies moderated victimisation & discrimination effects on suicide attempts: increased victimisation or discrimination increased suicide attempts at low level state policy but not medium or high levels Fewer gender-affirmative state policies is significantly associated with increased discrimination & victimisation, & increased suicide attempts
Ross-Reed et al. (2019) [7] (USA)	Cross-sectional	<p><i>n</i> = 858</p> <p>Natal male: <i>n</i> = 453</p> <p>Natal female: <i>n</i> = 435</p> <p>11–19 years (not provided)</p>	<p>Demographics</p> <p>Sexual violence, dating violence, Dichotomous Y/N;</p> <p>Gender identity Y/N to either Cis or Gender Minority;</p> <p>14 resiliency questions (family, peer, school, & community): 4-point Likert scale</p>	NSSI & past-year suicide attempts: Dichotomous y/N	<ul style="list-style-type: none"> Community support was non-significant in relation to NSSI and suicide attempts Family support was significantly correlated with lower odds for suicide attempts & NSSI Peer support was significantly correlated with NSSI
Russell et al. (2018) [44] (USA)	Cross-sectional	<p><i>n</i> = 129</p> <p>Transgender</p> <p>Gender nonconforming</p> <p>15–21 years (not provided)</p>	<p>Demographics</p> <p>Depressive symptoms: BDI for Youth;</p> <p>Chosen Name Use: Whether preferred name was different from name given at birth; Are you able to go by your preferred name at home; school; work with friends</p> <p>Social Support: CASSS</p>	Suicidal Ideation & behaviour: SHBQ	<ul style="list-style-type: none"> Chosen name use in more contexts predicted lower depression & reduced suicide ideation & behaviours - an increase of one context (home, work, school, with friends) predicted a 5.37 unit decrease in depressive symptoms, a 29% suicide ideation decrease & a 56% decrease in suicidal behaviour Depression, suicide ideation & suicidal behaviour were lowest when chosen name was used in all 4 contexts
Schein et al. (2020) [80] (USA)	Cross-sectional	<p><i>n</i> = 22,286</p> <p>Trans woman: 35.6%</p> <p>Trans man: 33.1%</p> <p>Nonbinary AFAB: 25.5%</p> <p>Nonbinary AMAB: 5.8%</p> <p>18+ (<i>M</i> = 30.9)</p>	<p>Psychological Distress: K-6</p> <p>Gender concordant identification: 1 item</p>	Suicide ideation: 3-items	<ul style="list-style-type: none"> Participants with all identity concordant documents for preferred name & gender had lower prevalence of suicide ideation & planning (adjusted prevalence ratio

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
					[APR] 0.78; 95% CI 0.72–0.85)
Seelman (2016) [81] (USA)	Cross-sectional	n = 2325 Trans male: 43.7% Trans female: 30.9% Gender nonconforming natal female: 16.6% Gender nonconforming natal male: 2.2% Crossdresser male: 4.7% Crossdresser female: 1.9% 18–76 years (M = 31.02)	Demographics, incl. disability status Generation (time period) when participant attended college & age in college; Denial of bathroom access in college; Gender-appropriate housing in college (due to trans status); Interpersonal victimisation: experience of harassment/bullying; physical assault/attack; sexual assault by teachers/staff at school/college due to trans status	Lifetime suicide attempts: Dichotomous Y/N	<ul style="list-style-type: none"> • Having some (vs no) concordant documents were associated with small reductions in suicide ideation (APR 0.95; 0.91–0.98) & planning (APR 0.93; 0.86–1.00) • Participants with some or all gender identity concordant documentation were significantly less likely to attempt suicide than those with no documents • Race, annual household income, physical or mental disability, being denied access to a school bathroom due to being transgender, being denied access to gender-appropriate campus housing due to being transgender were all significantly associated with lifetime suicide attempts • Being a TGD POC & having a physical or mental disability are all associated with suicide attempts • Denial of access to appropriate bathrooms & denial of access to appropriate campus housing were both significantly associated with lifetime suicide attempts • TGD people experiencing interpersonal victimisation (bullying, harassment, physical attack, sexual assault, harassment) from other students (but not teachers/staff) are 1.36x more likely to attempt suicide
Snooks & McLaren (2020) [82] (USA)	Cross-sectional	n = 848 Trans men: n = 197 Trans women: n = 614 18–80 years (M = 26.27)	Demographics Gender affirming surgery: Y/N/I'd rather not say; Interpersonal Needs: INQ-R; Depression: CES-D	Suicidal thought & behaviours: SBQ-R	<ul style="list-style-type: none"> • Perceived burdensomeness significantly predicted suicidal thoughts & behaviours • Dispositional hope was a protective factor against suicidal thoughts & behaviours when perceived burdensomeness was lower, however not when perceived burdensomeness was higher
Staples et al. (2018) [83] (USA)	Cross-sectional	n = 237 Gender identity other: 55.9% FTM: 24.6% MTF: 10.2%	Demographics Distal TGD stress: Daily Heterosexist Experiences Questionnaire; Internalised TGD	Suicide ideation: BSS; NSSI: DSHI	<ul style="list-style-type: none"> • Race/ethnicity were not significantly associated with suicide ideation or NSSI • Visibility as TGD and degree of maleness/

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
		Nonbinary: 9.3% 18–44 years (M = 28)	negativity; transgender identity scale (TGIS)		femaleness were all significantly associated with NSSI & suicide ideation <ul style="list-style-type: none"> • Harassment and victimisation were both positively associated with suicide ideation & NSSI • Internalised TGD-negativity was significantly associated with suicide ideation but not NSSI
Strauss et al. (2019) [84] (Australia)	Cross-sectional	n = 859 Transgender Gender diverse 14–25 years (M = 19.37)	Demographics Depressive Symptoms: PHQ-A; Anxiety: GAD-7; Self-reported psychiatric diagnoses, exposure to negative experiences, peer rejection, issues with educational setting, issues with accommodation, bullying, body dysphoria, discrimination, employment issues, experiencing significant loss, isolation from TGD people, isolated from services, helping others with mental health, lack of family support	Self-reported adverse health outcomes (incl. self-harm, suicidal thoughts & attempts - lifetime and past-year	<ul style="list-style-type: none"> • Factors significantly associated with lifetime desire to self-harm: Accommodation issues, bullying, discrimination, experiencing a significant loss, helping others with mental health issues, lack of family support, & school/university/TAFE issues • Factors not associated with desire to self-harm: Body dysphoria, employment issues, feeling isolated from not knowing TGD people, feeling isolated from services • Factors significantly associated with lifetime self-harm: Accommodation issues, bullying, discrimination, employment issues, experiencing a significant loss, feeling isolated from services, helping others with mental health issues, lack of family support, peer rejection, school/university/TAFE issues • Factors not associated with lifetime self-harm: Body dysphoria, feeling isolated from TGD people • Factors significantly associated with lifetime engagement in reckless life-endangering behaviours: Accommodation issues, body dysphoria, bullying, discrimination, employment issues, experiencing a significant loss, feeling isolated from services, lack of family support, peer rejection, school/university/TAFE issues • Factors not associated with lifetime engagement in reckless life-endangering behaviours: Feeling isolated from other TGD ppl, helping others with mental health issues

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Strauss et al. (2020) [85] (Australia)	Cross-sectional	<i>n</i> = 859 Transgender Gender diverse: 29.7% Trans men/men: 15% Trans women/women: 48.5% various nonbinary identities (incl. nonbinary trans masc, nonbinary transfemme, agender, bigender, pangender, and others) 14–25 years (<i>M</i> = 19.37)	Demographics Depressive symptom: PHQ-A (for adolescents); Anxiety: GAD-7; Self-reported psychiatric diagnoses: range of diagnoses listed (e.g., PTSD, eating disorders, substance use disorders) & <i>n</i> selected those which had received formal diagnoses; Exposure to abuse: various questions about negative experiences associated with poor mental health - 6 items	Self-harm & suicidal behaviours (self-harm ideation, self-harm, reckless behaviour endangering life, suicide ideation & suicide attempts): 5 items (3-point scale)	<ul style="list-style-type: none"> • Factors associated with lifetime suicide ideation: Accommodation issues, body dysphoria, bullying, discrimination, employment issues, experiencing a significant loss, feeling isolated from services, helping others with mental health issues, lack of family support, peer rejection. school/ university/TAFE issues • Factors not associated. with lifetime suicide ideation: Feeling isolated from other TGD people • Factors associated with lifetime suicide attempts: Accommodation issues, bullying, discrimination, employment issues, experiencing a significant loss, feeling isolated from services, lack of family support, peer rejection, school/university/TAFE issues • Factors not associated with lifetime suicide attempts: Body dysphoria & feeling isolated from not knowing other TGD people • Abuse (extrafamilial physical abuse, familial physical abuse, extrafamilial sexual abuse, intimate partner abuse other familial abuse (including emotional & verbal abuse & neglect)) were all significantly associated with self-harm & suicidal behaviours • Familial sexual abuse was significantly associated with suicide attempts & reckless behaviour which may endanger own life only
Suen et al. (2018) [86] (Hong Kong)	Cross-sectional	<i>n</i> = 106 Assigned male at birth: 63.2% Assigned female at birth: 38.8% 25->44 years (not provided)	Demographics Satisfaction with relationship status: Y/N; Quality of Life: 1-item- 6-point scale	Suicidality: 4-point scale -"never thought of suicide", "have had thoughts of suicide", "have often had thoughts of suicide", "have attempted suicide"	<ul style="list-style-type: none"> • Quality of life, age & monthly income together explained 15.8% of variance in suicidality • Quality of life was negatively & marginally significantly associated with suicide ideation (<i>p</i> = .058) • Age (15–24) was significantly associated with suicidality and were significantly more likely to report suicide ideation than >44 years (<i>p</i> = .041)

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Taliaferro et al. (2018) [87] (USA)	Cross-sectional	n = 2168 Transgender, genderqueer, genderfluid, or unsure about gender identity AMAB: 31.5% AFAB: 67.2% AFAB: 67.2% Declined to answer: 1.2% School grades 5, 8, 9, & 11 were given. These ages are 10–16 years (not provided)	Demographics Gender identity: Y/N beside relevant gender identity; Depressive Symptoms: PHQ-2; Gender-based bullying/victimisation (2-items); Physical bullying/victimisation: 1-item Parent connectedness: 3-items; Teacher/school adult relationships: Student Engagement Instrument: Friend caring: 1-item; Connectedness to non-parental adults: 2-items; School safety: item	Past year NSSI: How many times? >10 = repetitive	<ul style="list-style-type: none"> • Monthly Income (<HK \$6000) was significantly associated with increased likelihood of suicide ideation • Reduced quality of life was significantly associated with suicide ideation compared to people without suicide ideation ($p = .007$) • Age, monthly income & quality of life combined explained between 15.8% & 22% of variance in suicide ideation depending on analysis • TGD people aged 15–24 years were more likely to report suicide ideation ($p = .041$) • Quality of life negatively predicted suicide ideation ($p = .058$) • Past year NSSI was significantly associated with depression & gender-based or physical bullying victimisation • Greater connectedness to parents & non-parental adults were significant protective factors • There was a significant interaction between non-parental adult connectedness & gender-based bullying victimisation: Those who reported such victimisation to non-parental adults were less likely to report NSSI • Depression was the most significant risk factor associated with repetitive NSSI • Parent connectedness & school safety were the most important protective factors to mitigate NSSI
Taliaferro et al. (2019) [88] (USA)	Cross-sectional	n = 1635 Transgender or gender nonconforming: AMAB: 32% AFAB: 68.1% 14/15 years & 16/17 years (not provided)	Demographics Assigned sex & gender identity: 2-items; Family substance use: 2-items; Physical health problems & mental health problems: both 1-item; Positive screen for depression: 2-items; Physical or sexual abuse: 3-items; Relationship violence, witness to family violence & teasing: all 2-items; Bullying: 4-items;	NSSI: 2-Item scale - 1 asking about past year NSSI engagement & how many times Suicide attempts: Ever attempted suicide, in past year, or no	<ul style="list-style-type: none"> • Being a natal female was significantly associated with increased likelihood of NSSI • People in Grade 9 (age 14/15) & receiving free/reduced price lunches were more likely to report NSSI • Mental health difficulties, being a victim of teasing due to gender/gender expression, running away from home, & alcohol use were all significantly associated with NSSI (leading factors: mental

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
			running away, violence perpetrator, skipped school, cigarette smoking, alcohol use, binge drinking: all 1-item Parent connectedness: 3-items; connectedness to other adults: 2-items; school engagement & teacher/school adult relationships: both 6-items; neighbourhood safety: 2-items; prescription drug misuse: 4-items; illegal drug use: 5-items; multiple sexual partners: 2-items; bullying perpetrator: 4-items; friend caring, sport participation, involvement in school activities, religious activities, physical activity, school plans, academic achievement, school safety: all 1-item		health problem, depressive symptoms, alcohol use) <ul style="list-style-type: none"> • No significant difference in NSSI by race/ethnicity or school location (city or other) • Long-term mental health problems, depression, running away, substance use were all significantly associated with experiencing both NSSI & suicide attempts • Physical or sexual abuse, relationship violence, bullying victimisation, less non-parental connectedness to adults, academic achievement, & marijuana use differentiated this group (NSSI & suicide attempts) from the NSSI only group: Leading factors were mental health problems, running away from home, lower levels of connectedness to non-parental adult, & marijuana use • Mental health problem, physical or sexual abuse, relationship violence, bullying victimisation, less parental connectedness, lower grades, lower levels of perceived school safety, & running away from home were all significantly associated with suicide attempts • Increased parental connectedness & school safety differentiated NSSI & suicide attempt group from NSSI only group
Tebbe & Moradi (2016) [89] (USA)	Cross-sectional	n = 353 Transgender (trans women, trans men, non-binary) 18–66 years (M = 25.21)	Demographics Prejudice & discrimination: DHEQ; Internalised antitrans attitudes: IHS; Fear of antitrans stigma: Gender-Related Fears subscale of Transgender Adaptation & Integration Measure; Drug use: Brief DAST; Alcohol use: AUDIT; Depressive symptoms: CES-D Social Support: Family, Friend, & Significant Other subscale of MSPSS	Suicide risk: SBQ-R	<ul style="list-style-type: none"> • Internalised anti-trans attitudes, drug use & depression all had a direct significant association with suicide ideation & attempts • Perceived discrimination, fear of anti-trans stigma, family support, significant other support, friend support, & alcohol use were not directly significantly related to suicide ideation & attempts • No difference by group (trans women, trans man, non-binary)
Testa et al. (2012) [90] (USA)	Cross-sectional	n = 271 Tran women: n = 179 Tran men: n = 92 18–69 years (M = 37)	Demographics Physical violence: 1 item, then 1 item regarding how many times these were gender-identity	Suicide ideation & attempts: Dichotomous Y/N & how many times	<ul style="list-style-type: none"> • Physical violence was significantly associated with suicide ideation in trans women but not trans men

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Testa et al. (2017) [91] (USA & Canada)	Cross-sectional	n = 816 Trans man; Trans woman; female to different gender; male to different gender; Intersex 18+ (M = 32.53)	related; Sexual violence: 1 item, then 1 item regarding how many times these were gender-identity related; Alcohol abuse: Dichotomous Y/N; Illicit substance use: Dichotomous Y/N Demographics External & internal gender minority stress: GMSR; Belongingness & perceived burdensomeness: INQ-121	Past year suicide ideation: SIS; Lifetime suicide ideation: 1-item; Lifetime suicide attempts: SA: 1-item	<ul style="list-style-type: none"> Physical violence was significantly associated with suicide attempts in trans men and trans women Sexual violence was significantly associated with suicide ideation in trans men but not trans women Sexual violence was significantly associated with suicide attempts in trans men and trans women Regarding Model 1 (GMSR): Indirect path of rejection to suicide ideation through internalised transphobia & negative expectations but not non-disclosure was significant Indirect path from non-affirmation to suicide ideation through internalised transphobia & negative expectations but not through non-disclosure was significant Internalised transphobia & negative expectations were significantly positively associated with suicide ideation, but non-disclosure was non-significant Regarding Model 2 (IPTS): Examined associations between internal gender minority stressors & suicide ideation through perceived burdensomeness & thwarted belongingness: Model fit was excellent Indirect path to suicide ideation through thwarted belongingness & perceived burdensomeness Thwarted belongingness & perceived burdensomeness were each significant predictors of suicide ideation
Toomey et al. (2018) [92] (USA)	Cross-sectional	n = 1773 Trans female: n = 202 Trans male: n = 175 Nonbinary: n = 344 Questioning: n = 1052 11–19 years (M = 14.7)	Demographics including highest parental education level, urbanicity, & gender identity	Lifetime suicide behaviour: Dichotomous Y/N 1-item: "Have you ever tried to kill yourself?"	<ul style="list-style-type: none"> Nonheterosexuality, identifying as a racial/ethnic minority (non-White), older adolescents (age not specified) were all associated with higher odds of reported suicide behaviour Higher parental education level & residing in urban spaces were significantly associated with lower odds of suicide behaviour Within each gender identity group: Transgender adolescents: non-

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Tretharne et al. (2020) [93] (Aotearoa/New Zealand & Australia)	Cross-sectional	n = 700 (TGD: n = 293; cisgender; n = 308) 18–74 years (M = 30)	Demographics Discrimination: EDS; Psychological Distress: K-10 Perceived social support: MSPSS; Resilience: BRS	Suicidal ideation: SIDAS Suicide ideation & attempts: Series of single items about suicidality; Self-harm: DSHI	heterosexual sexual orientation was associated with higher odds of suicide behaviour <ul style="list-style-type: none"> For questioning adolescents: parent education (higher) was a protective factor Trans adolescents identifying as bisexual, gay, or lesbian were associated with higher odds of reporting suicidal behaviour No sociodemographic characteristics were significantly associated with suicidal behaviour in nonbinary adolescents TGD people were significantly more likely to have lifetime suicide attempts compared to cis people Younger age significant for cis but not TGD people TGD people who live with people were 5x more likely to have suicide attempts than those who live alone Discrimination was significantly associated with suicide attempts in TGD people compared to cis people Distress was significantly associated with suicide ideation in TGD & cis people Distress was significantly associated with suicide ideation & attempts in TGD people only Higher social support was significantly associated with reduced self-harm in TGD people but not cis people Higher resilience was a significant protective factor for cis people but not trans people
Trujillo et al. (2017) [94] (USA)	Cross-sectional	N = 78 Transmen: 33.3% Transwomen: 37.2% Another gender: 29.5% 18+ (not provided)	Demographics Anti-trans discrimination: HHRDS; Depression & Anxiety: HSCL-25 Perceived social support: MSPSS	Suicidality: SBQ	<ul style="list-style-type: none"> Anti-TGD discrimination was positively related to suicide ideation Harassment & rejection were both positively associated with suicide ideation Depression was a significant predictor of suicide ideation Anxiety was not significantly related to suicide ideation or attempts

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Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Turban et al. (2019) [95] (USA, incl. Guam, American Samoa, & Puerto Rico & military bases)	Cross-sectional	<i>n</i> = 27,715 Crossdresser: 2.6% Trans woman: 63.4% Trans man: 21.1% Nonbinary/ genderqueer AFAB: 8.5% Nonbinary/ genderqueer AMAB: 4.5% 18->65 years (<i>M</i> = 31.2)	Demographics Lifetime exposure to GICE: binary Y/N; Experiencing GICE <10yrs; Binge Drinking during past month: >1 -day consuming >5 alcoholic drinks; Cigarette & illicit drug use (excl. marijuana); Psychological distress: K-10	Suicide ideation I in past year/SA requiring inpatient hospitalisation in past year; Lifetime suicide ideation & attempts	<ul style="list-style-type: none"> • Depression was a mediator between discrimination & harassment & suicide ideation • Social support from significant other (not from family or friends) moderated experiences of harassment & rejection with suicide ideation (so buffers impact) • 19.6% reported lifetime GICE exposure • Lifetime GICE exposure was significantly associated with severe psychological distress during previous month & lifetime suicide attempts • Recalled lifetime GICE exposure was also significantly associated with higher odds of lifetime suicide attempts • After adjusting for statistically significant demographics, GICE exposure <10yrs was significantly associated with increased odds of lifetime suicide attempts
Veale et al. (2017) [15] (Canada)	Cross-sectional	<i>n</i> = 923 Trans girls/women Trans boys/men Nonbinary AFAB Nonbinary AMAB 14–25 years (Not provided)	Demographics Enacted stigma: Enacted Stigma Index; Stress: Single items from General Wellbeing Schedule School connectedness: School Connectedness Scale; Family Connectedness: 7-items (non-validated); 19–25 yr olds were given 8-item Parent Connectedness Scale; Friend Support: 1-item; Social Support: 19–25 yr olds: Medical Outcomes Study Social Support Survey	Suicidality: NSSI, suicide ideation & attempts: Dichotomous Y/N	<ul style="list-style-type: none"> • Enacted stigma, discrimination, & harassment were all positive predictors of NSSI, suicide ideation & suicide attempts (especially for NSSI) • Social support was negatively associated with NSSI, suicide ideation & suicide attempts • For 14–18-year-olds: family connectedness was the strongest protective factor
Veale et al. (2021) [96] (Aotearoa/New Zealand)	Cross-sectional	<i>n</i> = 610 Trans and nonbinary 14–83 years (<i>M</i> = 32.1)	Demographics GICE: 1-item; Mental Health: K10; Family rejection: GMSR (1-item); Internalised transphobia: 3-items from Gender Identity Self-Stigma Scale	NSSI, suicide ideation & attempts: using questions from the NZ Youth 2000 series: No to more than 5 times (5-point scale)	<ul style="list-style-type: none"> • GICE exposure x 2 increased odds of NSSI & suicide ideation • GICE exposure was associated with 4x increased odds of suicide attempts
Wang et al. (2021) [97] (China)	Cross-sectional	<i>n</i> = 1293 Transgender & gender queer 13–29 years (<i>M</i> = 21.93)	Demographics Depression: CESD-9; Anxiety: GAD-7; Presence or absence of parental psychological abuse; Self-esteem: RES	Suicide & self-harm risk: 4-items	<ul style="list-style-type: none"> • Trans women were at increased suicide and self-harm risk compared to trans men & gender queer people • Parental abuse was significantly associated

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Woodford et al. (2018) [98] (USA)	Cross-sectional	n = 214 Transgender 18+ (M = 22.83)	Demographics LGBTQ interpersonal microaggressions & victimisation on campus (frequency): 7-items incl. bathroom use & being referred to as old/natal gender; Victimisation: Sexual Orientation Victimisation Questionnaire	Suicide attempts: 1-item	with suicide & self-harm risk <ul style="list-style-type: none"> • Parental psychological abuse/neglect was significantly associated with risk of suicide & self-harm • Depression was significantly associated with self-harm & suicide in trans women & gender queer people • TGD people reported significantly more suicide attempts than cis-LGBQ peers • Victimisation was significantly associated with TGD suicide attempts • Resilience was significantly associated with decreased odds of suicide attempt • TGD environmental & interpersonal microaggressions were not significantly related to suicide attempts • Pride & outness (with gender identity) were not significantly associated with suicide attempts
Yadegarfarid et al. (2014) [99] (Thailand)	Cross-sectional (between groups)	n = 260 Trans women: n = 129 Cis men: n = 131 15–25 years (M = 20)	Demographics Family Rejection: 6-item measure designed for this study (no measure exists); Social Isolation: SSA; Loneliness: ICLA Loneliness Scale-Short; Depression: DASS-21 (short version); Sexual Risk Behaviour: 'series of questions'	Suicidal thoughts & attempts: PANSI	<ul style="list-style-type: none"> • Compared to cis people, TGD people reported significantly higher family rejection, lower social support, higher loneliness, higher depression, lower protective factors (PANSI-Positive) & higher negative risk factors (PANSI negative) related to suicide behaviour • Social Isolation was a significant predictor of TGD suicidal thinking
Yockey et al. (2020) [100] (USA)	Cross-sectional	n = 790 Transgender 18+ (not provided)	Demographics Interpersonal Violence: Y/N; Lifetime substance use (cigarettes, alcohol, vaping, & prescription drugs): 4-items Y/N	Suicidal Behaviours 3-items Y/N	<ul style="list-style-type: none"> • Gender, age, marital status, income, transgender status disclosure, & alcohol usage were all significantly associated with suicide ideation • Age, marital status, income, transgender status disclosure, & interpersonal victimisation were all significantly associated with suicide planning • Gender, victimisation, alcohol use, cigarette smoking, vaping, & use of illegal/prescription drugs were all significantly associated with suicide attempts

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Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Yockey et al. (2022) [101] (USA)	Cross-sectional	<i>n</i> = 27,715 Transgender, nonbinary, genderqueer and others 18+ (not provided)	Demographics Psychological victimisation and harassment: 1 item Y/N; Family support: 1-item 3- point scale	Past year suicide ideation: 1- item Y/N	<ul style="list-style-type: none"> Older age (25–44 & 65+) was significantly associated with decreased suicide ideation in the past year Asian/Pacific Islanders reported decreased suicide ideation compared to White people Lower income was significantly associated with increased suicide ideation Gender identity (nonbinary/genderqueer) was significantly associated with increased suicide ideation Having a neutral or unsupportive family was significantly associated with increased suicide ideation Victimisation & violence were significantly associated with suicide ideation
Zeluf et al. (2018) [102] (Sweden)	Cross-sectional	<i>n</i> = 796 Trans feminine: 19% Trans masculine: 23% Gender nonbinary: 44% Transvestite: 14% Missing: 0.2% 15–94 years (not provided)	Demographics TGD-related victimisation: 3-items (not specified); Stigma: SCS; <i>Trans</i> -related healthcare issues; 2-items; Change of legal gender: 1- item; Illicit drug use & risky alcohol consumption: 1- item each Life Satisfaction: Life Satisfaction Scale; Social Support: 1-item; Practical support: 1-item; Openness with trans identity: not specified	Past year suicide ideation: Yes once; yes, several times; No Lifetime suicide attempts: Yes, between past 2 weeks & 1 year ago; yes, more than a year ago; No	<ul style="list-style-type: none"> Unemployment or long-term sick leave, country of birth other than Sweden, & risky alcohol consumption were significantly associated with suicide ideation Older age was significantly associated with decreased risk of suicide ideation (older age offers some buffering effect against suicide ideation) After controlling for above covariates: Offensive treatment in past 3-months, lifetime exposure to TGD-related violence, less satisfaction with contacts with friends/acquaintances & less satisfaction with own psychological wellbeing were significantly associated with suicide ideation Unemployment or long-term sick-leave, illicit drug use in past 6-months, & risky alcohol consumption were significantly associated with lifetime suicide attempts After controlling for these variables: Offensive treatment in past 3-months, lifetime exposure to TGD-related violence & never having practical support remained significantly associated with lifetime suicide attempts

(continued on next page)

Table 2 (continued)

Author/s & date (Location)	Study design	Participant characteristics	Outcome measures (Demographics, risk factors, protective factors)	Self-harm definition & measure	Key findings
Zwickl et al. (2021) [103] (Australia)	Cross-sectional	n = 928 Trans male: 26% Trans female: 22% Gender non-binary: 14% Gender Queer: 4% Agender: 2% Gender Fluid: 2% Gender Neutral: 1% Other - 3% 18–79 years (Median = 28 years)	Demographics Access to gender affirming hormones; access to gender affirming surgery; Access to trans support groups (Y/N/Unsure); Perceived discrimination from employment, housing, healthcare, &/or government services: items about different aspects of these factors; Self-reported depression diagnosis: Y/N; Physical assault: Y/N	Self-harm & suicide attempts: 1-item each Y/N/prefer not to say	<ul style="list-style-type: none"> • TGD-related victimisation was significantly associated with suicidality despite access to gender-affirming healthcare • Protective factors: legal gender recognition & access to gender-affirming healthcare were non-significant (though they measured desire to or whether it had begun, rather than completed medical transition) • There was no significant association between stigma & suicidality • There were no differences in suicidality between TGD experiences (identity) nor judicial status • States of residence within Australia & locality (rural vs. metropolitan) were not significantly different in the proportion of suicide or self-harm • Unemployment, depression, desiring gender-affirming surgery in the future, history of physical assault, & institutional discrimination (incl. discrimination while accessing healthcare, including gender affirming healthcare), in employment, housing, & accessing gov services) were all significantly associated with increased odds of lifetime suicide attempts • Access to TGD support groups was not a significant protective factor • Being presumed male at birth was significantly associated with lower odds of lifetime suicide attempts • Physical assault was reported by 23% & was significantly associated with a 200% increase in lifetime suicide attempt odds • Unemployment was significantly associated with 55% higher odds of lifetime suicide attempts • Self-reported depression was significantly associated with 300% increased odds of suicide attempts • Not being able to access surgery was significantly associated with 73% increased odds of suicide attempts

Papers are ordered alphabetically.

Abbreviations:

ACSS = Acquired Capability Suicide Scale	LEC-5 = Lifetime Events Checklist for DSM-5
ASAB = Assigned sex at birth	LOT-R = Life Orientation Test-Revised
AUDIT = Alcohol Use Disorders Identification Test	MTDG = Male to different gender
BDI = Beck Discrimination Inventory	MDS = Modified Depression Scale
BIS = Body Investment Scale	MSPSS = Multidimensional Scale of Perceived Social Support
Brief-DAST = Brief Drug Abuse Screening Test	MTF = Male to Female
BRS = Brief Resilience Scale	NHAI = Nungesser Homosexual Attitudes Inventory
BSI = Brief Symptom Inventory	NSSI = Nonsuicidal Self-Injury
BSS = Beck Scale for Suicide Ideation	PANSI = Positive & Negative Suicide Ideation Inventory
CAPA = Child & Adolescent Psychological Abuse Measure	PDS = Perceived Discrimination Scale
CASSS = Child & Adolescent Social Support Scale	PHQ-9 = Patient Health Questionnaire
CES-D = Center for Epidemiological Studies Depression Scale	POC = Person of Colour
CBCL = Child Behavior Checklist	PPES = Painful & Provocative Events Scale
DASS-21 = Depression Anxiety Stress Scales	PSS-Fa = Perceived Social Support-Family
DHEQ = Modified Daily Heterosexist Experiences Questionnaire	PSS-Fr = Perceived Social Support-Friends
DERE-SF = Difficulties in Emotion Regulation Scale-Short Form	PTSD = Post-Traumatic Stress Disorder
DSHI = Deliberate Self-Harm Inventory	RFL = Reasons for Living Inventory
EDS = Everyday Discrimination Scale	RHAI = Revised Homosexuality Attitude Inventory
FTDG = Female to different gender	RHM = Reactions to Homosexuality Measure
FTM = Female to male	RHS = Reactions to Homosexuality Scale
GAD-7 = Generalised Anxiety Disorder Scale	RSA = Resilience Scale for Adults
GCS = Gender Conformity Scale	RSE = Rosenberg Self-Esteem Scale
GICE = Gender Identity Change Efforts	SBQ-R = Suicide Behaviors Questionnaire-Revised
GMSR = Gender Minority Stress & Resilience Measure	SCL-90-R = Symptom Checklist 90-Revised
HADS = Hospital Anxiety & Depression Scale	SCS = Stigma Consciousness Scale
HBDS = Hamburg Body Drawing Scale	SHBQ = Self-harm Behaviors Questionnaire
HRD = Harassment, rejection & discrimination	SHI = Self-Harm Inventory
HRDS = Heterosexist, Rejection, & Discrimination Scale	SIDAS = Suicidal Ideation Attributes Scale
HSCL-25 = Hopkins Symptoms Checklist-25	SITBI = Self Injurious Thoughts & Behaviors Interview
IHS = Internalised Homonegativity Subscale	SIQ = Self-Injury Questionnaire
IIP-32 = Inventory of Interpersonal Problems	SIQ-TR = Self-Injury Questionnaire-Trauma Related
INQ = Interpersonal Needs Questionnaire	SRI-25 = Suicide Resilience Inventory-25
INQ-R = Interpersonal Needs Questionnaire-Revised	SS-A = Social Support Appraisals Scales
ISAS = Non Suicidal Self-Injury and Inventory of Statements about Self-Injury	STI = Sexually Transmitted Infections
IPTS = Interpersonal Psychological Theory of Suicide	TAFE = Technical & Further Education
K-6 = Kessler Psychological Distress Scale-6	TAIM = Transgender Adaption & Integration Measure
K-10 = Kessler Psychological Distress Scale-10	TCS = Transgender Congruence Scale
	TYC-GDS = Trans Youth CAN! Gender Distress Scale
	TYC-GPS = Trans Youth CAN! Gender Positivity Scale
	YRB = Youth Risk Behavior Survey
	YSR = Youth Self Report

reviews of suicidality and SH [24,107]. Two reviewers (KB & LM) independently assessed methodological quality of studies and achieved full agreement. See Table 3 for assessment findings.

Thirty-six cross-sectional studies received a 'high' quality rating. The remaining thirty-seven were 'medium' quality, indicating some bias (results of quality assessment are presented in Table 2). Bias was associated in the following three areas. First, fifty-three studies omitted data comparing respondents and non-respondents, which is important to increase external validity of results [108]. Second, twenty-seven cross-sectional studies did not control for confounding variables. Future studies should control for covariates to ensure their impact on findings is understood and accounted for [109]. Finally, sixty-three studies did not justify sample size despite most having in excess of 200-participants. Including a power analysis would be an effective way for future studies to improve in terms of quality.

The case-control study [55] was rated 'high' quality where bias related to outcomes ascertained using self-report methods. Finally, the cohort study [67] received a 'medium' rating where bias related to a selective participant sample and not controlling for covariates. Three studies used medical records [26,108] or chart review [26] methods. No bias risk assessments exist for these methods, so quality assessment is not possible. However, as they provide valuable evidence regarding TGD self-harm, they were included. However, there are limitations to consider. For example, it is difficult to determine whether information was missed, misinterpreted, or mis-recorded by clinicians, which may impact our understanding as establishing causal relationships between factors and outcomes is difficult [110]. The heterogeneity of risk and/or protective factors investigated across eligible studies precludes meaningful results from a meta-analysis [111]. Consequently, a narrative synthesis was used to describe and summarise findings.

3.5. Risk and protective factors for self-harm and suicidality in TGD people

3.5.1. Protective factors

Overall, few studies examined protective factors for TGD self-harm. The heterogeneity of protective factors investigated made it difficult to classify factors into domains. However, some themes were identified. These are social and/or family support,

Table 3
Results of the risk of bias and quality assessments.

Cross-sectional studies:								
Author/s (Date)	Representativeness of sample	Sample size	Non-respondents	Risk factor measure	Comparability	Assessment of outcome	Statistical test	Quality rating
Arcelus et al. (2016) [11]	Y	Y		YY		Y	Y	Moderate
Almazan et al. (2021) [33]	Y		Y	Y	YY	Y	Y	High
Andrew et al. (2020) [34]				YY		Y	Y	Moderate
Austin et al. (2020) [35]	Y		Y	YY		Y	Y	Moderate
Azeem et al. (2019) [36]	Y		Y	Y	Y		Y	Moderate
Barboza et al. (2016) [37]	Y			Y	Y	Y	Y	Moderate
Başar & Öz. (2016) [38]	Y			YY		Y	Y	Moderate
Bauer et al. (2015) [21]	Y	Y		YY	YY	Y	Y	High
Becerra et al. (2021) [40]	Y			YY	YY	Y	Y	High
Brennan et al. (2017) [39]	Y			YY		Y	Y	Moderate
Bosse et al. (2022) [41]	Y		Y	YY	YY	Y	Y	High
Budhwani et al. (2018) [42]				Y	YY	Y	Y	Moderate
Burish et al. (2022) [43]	Y	Y	Y	YY		Y	Y	High
Busby et al. (2020) [104]	Y			YY	YY	Y	Y	High
Campbell et al. (2023) [45]	Y				YY	Y	Y	Moderate
Cerel et al. (2021) [46]	Y			Y		Y	Y	Moderate
Chen et al. (2019) [47]	Y			YY		Y	Y	Moderate
Chen et al. (2020) [48]	Y			YY		Y	Y	Moderate
Chinazzo et al. (2023) [49]	Y			YY		Y	Y	Moderate
Claes et al. (2015) [50]	Y			YY	Y	Y	Y	Moderate
Cogan et al. (2020) [51]	Y		Y	YY		Y	Y	Moderate
Cogan et al. (2021a) [52]	Y		Y	YY		Y	Y	Moderate
Cogan et al. (2021b) [53]	Y			YY	YY	Y	Y	High
Cramer et al. (2022) [54]	Y	Y		YY		Y	Y	Moderate
de Graaf et al. (2020) [99]	Y	Y		YY		YY	Y	High
dickey et al. (2015) [57]	Y			YY		Y	Y	Moderate
Drescher et al. (2021) [58]	Y			Y	YY	Y	Y	Moderate
Drescher et al. (2023) [59]	Y			YY		Y	Y	Moderate
Edwards et al. (2019) [60]	Y			YY	YY	Y	Y	Moderate
Goldblum et al. (2012) [61]	Y			Y	Y	Y	Y	Moderate
Gower et al. (2018) [62]	Y			YY	YY	Y	Y	High
Green et al. (2021) [63]	Y		Y	YY	YY	Y	Y	High
Grossman & D'Augelli (2007) [64]	Y			YY	Y	YY	Y	High
Grossman et al. (2016) [65]	Y			YY	YY	Y	Y	High
Jackman et al. (2018) [13]	Y			YY		Y	Y	Moderate
Kaplan et al. (2016) [66]	Y	Y		YY		Y		Moderate
Klein & Golub (2018) [68]	Y		Y	Y	YY	Y	Y	High
Kota et al. (2020) [69]	Y			YY	YY	Y	Y	High
Kuper et al. (2018) [70]	Y			YY	YY	Y	Y	High
Maguen & Shipherd (2010) [72]	Y			Y	YY	Y	Y	Moderate
Maksut et al. (2020) [74]	Y			YY	YY	Y	Y	High
Marx et al. (2019) [75]	Y	Y	Y	Y		Y	Y	Moderate
Moody & Smith (2013) [76]	Y			YY	YY	Y	Y	High
Parr & Howe. (2019) [77]	Y			YY	YY	Y	Y	High
Perez-Brumer et al. (2015) [78]	Y			YY	YY	Y	Y	High

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Table 3 (continued)

Cross-sectional studies:									
Author/s (Date)	Representativeness of sample	Sample size	Non-respondents	Risk factor measure	Comparability	Assessment of outcome	Statistical test	Quality rating	
Rabasco & Andover (2020) [79]	Y			YY	YY	Y	Y	High	
Ross-Reed et al. (2019) [7]	Y			YY	YY	Y	Y	High	
Russell et al. (2018) [44]	Y			YY	YY	Y		Moderate	
Scheim et al. (2020) [80]	Y		Y	YY	YY	Y	Y	High	
Seelman. (2016) [81]	Y		Y	Y	YY	Y	Y	Moderate	
Snooks & McLaren (2020) [82]	Y			YY	YY	Y	Y	High	
Staples et al. (2018) [83]	Y			YY	YY	Y	Y	High	
Strauss et al. (2019) [84]	Y			YY	YY	Y	Y	High	
Strauss et al. (2020) [85]	Y			YY		Y	Y	Moderate	
Suen et al. (2018) [86]	Y			Y		Y	Y	Moderate	
Taliaferro et al. (2018) [87]	Y			YY	YY	Y	Y	High	
Taliaferro et al., (2019) [88]	Y	Y	Y	Y	YY	Y	Y	High	
Tebbe & Moradi. (2016) [89]	Y		Y	YY		Y	Y	Moderate	
Testa et al. (2012) [90]	Y			Y	Y	Y	Y	Moderate	
Testa et al. (2017) [91]	Y	Y	Y	YY	Y	Y	Y	High	
Toomey et al. (2018) [92]	Y			Y	Y	Y	Y	Moderate	
Treharne et al. (2020) [93]	Y			YY	YY	Y	Y	High	
Trujillo et al. (2017) [94]	Y			YY		Y	Y	Moderate	
Turban et al. (2019) [95]	Y	Y	Y	Y	YY	Y	Y	High	
Veale et al. (2017) [15]	Y		Y	YY		Y	Y	Moderate	
Veale et al. (2021) [96]	Y			YY	YY	Y	Y	High	
Wang et al. (2021) [97]	Y			YY	YY	Y	Y	High	
Woodford et al. (2018) [98]	Y		Y	YY	YY	Y	Y	High	
Yadegarfar et al. (2014) [99]	Y			YY		Y	Y	Moderate	
Yockey et al. (2020a) [100]	Y		Y	Y	YY	Y	Y	High	
Yockey et al. (2022) [101]	Y		Y	Y	YY	Y	Y	High	
Zeluf et al. (2018) [102]	Y			YY	YY	Y	Y	High	
Zwickl et al. (2021) [103]	Y			Y		Y	Y	Moderate	
Cohort/Longitudinal studies:									
Author/s (Date)	Representativeness of exposed cohort	Selection of non-exposed cohort	Ascertainment of exposure	Demonstration outcome of interest was not present at start of study	Comparability of cohorts on basis of design or analysis (Max 2*)	Assessment of exposure	Was follow-up long enough for outcomes to occur?	Adequacy of follow up of cohorts	Quality rating
Kaplan et al. (2020)		Y		Y			Y	Y	Medium
Case-Control Studies:									
Author/s (Date)	Case Definition Adequate	Representativeness of Cases	Selection of Controls	Definition of Controls	Comparability of cases & controls	Ascertainment of exposure	Same method for cases & controls	Non-response rate	Quality rating
Davey et al. (2016)	Y	Y	Y	Y	YY		Y		High

NB. Ratings were in accord with the Newcastle-Ottawa Scales adapted for cross-sectional, case-control, and cohort & longitudinal studies.

connectedness, and school-related factors. Due to heterogeneity of remaining protective factors, they were classified as TGD-specific and general protective factors.

3.5.2. Social and/or family support

Thirteen studies found a significant correlation between social, and/or family support and reduced TGD self-harm and suicidality [21,66,62,102,67,69,99,70,76,37,54,75,93]. Ross-Reed et al. [7] also found family support correlated significantly with reduced suicide attempts and NSSI, though community and peer support were non-significant. Similarly, Trujillo and colleagues [94] found partner support moderated risk, but family/friend support did not. A further study found perceived social support significantly associated with emotional stability which, in turn, was negatively associated with suicide risk [60]. However, independently there was no relationship between social support and suicide risk. Both Zeluf et al. [102] and Yockey et al. [100] found receiving neutral or no support correlated with increased risk of self-harm, suggesting receiving positive social support may reduce risk. Only five studies reported non-significant findings [13,50,89,43,49], though participants with self-harm history in Claes and colleagues [47] study received less support than people without self-harm history. Overall, findings provide compelling evidence of the protective and mitigating nature of social support on TGD self-harm and suicidality and highlight the importance of TGD people having accessible avenues of support. Further, they align with findings from a recent scoping review examining the role of peer support in reducing TGD suicide risk [28].

3.5.3. Connectedness

Three studies found parental connectedness associated with significantly lower odds of self-harm and/or suicidality [4,62,88]. Two further studies found connectedness to non-parental adults a significant protective factor [4,88]. Brennan et al. [39] found community connectedness a marginally negative predictor of suicide attempts. However, two studies found no correlation [43,51]. Surprisingly, transgender community connectedness was non-significant [13]. Two studies investigated social connectedness with mixed results. One study each found social connectedness a non-significant [104] and significant [39] protective factor. 'Friend caring' was investigated by two studies. This was included as a connectedness factor in line with previous studies of self-harm in minority youth [112]. A study each found 'friend caring' significantly [4] and non-significantly [88] correlated with reduced self-harm and suicidality. Overall, evidence presented indicates connectedness may be an important protective factor against TGD self-harm and suicide risk.

3.5.4. School-related protective factors

Three studies found feeling safe at school significantly correlated with reduced suicidality [4,4,62]. The 1-item scale used to measure school safety was ambiguous, so it is unclear whether school safety relates to TGD-specific or general school safety. Additionally, its ambiguity possibly elicited participant responses which were either TGD-specific and general, or both, so further clarity here is important. School belonging was also a significant factor [75]. Other school-related factors investigated were teacher/school adult relationships [4,62,88], sports participation, and involvement with school activities [4]. Considering the protective nature of school safety there was, surprisingly, no correlation between these factors and reduced self-harm. Possibly, a safe school environment offers more protection than individual associated factors. Also, effects may be limited to students in these studies and further research may yield different results. However, the evidence presented here suggests ensuring a safe school environment for TGD students may provide a key self-harm and suicide prevention opportunity.

3.5.5. Risk factors

Investigated risk factors also varied greatly, however there was some homogeneity. These were assigned sex at birth (ASAB), age, race/ethnicity, income, education level, gender identity, and depression or depressive symptoms, drug and alcohol use, gender-minority stressors, victimisation, and discrimination. The remaining risk factors were investigated by fewer than five studies. These are listed in Table 1.

3.5.6. Assigned sex at birth

Eleven studies examined ASAB. Of these, eight found being assigned female at birth (AFAB) significantly correlated with lifetime and current NSSI/suicide attempts [4,11,84,56,50,71,72,46]. Additionally, Jackman et al. [13] found transgender men were significantly more likely to use NSSI to reduce 'bad feelings'. Given their identity, these participants were likely AFAB. Two studies found no significant correlation [86,41], while Zwickl et al. [103] reported being assigned male at birth was associated with lower odds of suicide attempts. Finally, one study [70] reported birth-assigned sex a significant predictor of suicide, though which birth-assigned sex was not clarified. However, overall, findings indicate TGD people AFAB are in particular need of support.

3.5.7. Age

Twenty-four studies investigated age as a risk factor. Six reported no significant correlation between age and self-harm and/or suicidality [78,66,102,71,36,93] and one [26] found older age associated with increased suicide attempts. The remaining studies found younger age significantly correlated with self-harm and/or suicidality [13,92,39,55,73,86,42,50,70,74,41,61,68,72,46,100,101]. This is in line with evidence regarding self-harm/suicidality in the general population [5] and highlights the need for interventions targeting young TGD people.

3.5.8. Depression or depressive symptoms

Nineteen studies investigated depression or depressive symptoms. Seventeen reported a significant correlation between depression

or depressive symptoms and self-harm and/or suicidality [4,11,84,88,94,42,48,103,99,47,70,89,71,36,49,57,97]. Two reported no correlation [66,69]. However, one of these [66] reported 55% of participants with suicide attempt history also experienced depressive symptoms suggesting a possible relationship. Overall, these findings indicate depression and depressive symptoms are a significant risk factor for self-harm and suicidality and are a key intervenable target.

3.5.9. Physical and sexual assault

Both sexual assault/rape [74,52,54,75,85,90,58] and physical assault [4,81,88,103,48,71,40,85,90,100] are strongly correlated with TGD self-harm. All studies examining these factors recorded significant results. These results are deeply concerning but unsurprising considering TGD people experience high rates of both sexual and physical violence [90]. Supporting TGD who experience physical or sexual assault is likely to be an essential self-harm reduction strategy and will reduce the wider negative impact on mental health and wellbeing.

3.5.10. Illicit drug and alcohol use

In total, four [102,48,37,100] of six [102,48,69,89,37,100] studies reported alcohol use associated with self-harm. Similarly, six [102,42,89,36,75,100] of eight [102,42,69,89,36,72,75,100] studies found illicit drug use correlated with self-harm. These findings are in line with the general population [89] and strongly indicate reducing drug and/or alcohol use is likely to be important in reducing self-harm risk in TGD populations. Drug and alcohol use may also be linked to other mental health outcomes and self-harm risk factors [62,42]. Therefore, identifying whether drugs and/or alcohol are being utilised and addressing their use may have wide-reaching health and wellbeing benefits for TGD people.

3.5.11. Gender-minority stressors

All seven studies [39,70,79,91,37,52,53] examining gender-minority stressors reported significant relationships with self-harm and suicide-related outcomes. Six used the Gender-Minority Stress-Resilience Measure which examines the impact of proximal (internalised transphobia, negative expectations of future events, concealment of gender identity) and distal (gender-related discrimination, rejection, victimisation, non-affirmation of gender identity) stressors. Two studies reported distal stressors were significant predictors of suicide ideation, attempts, or risk [39,53] and were associated with proximal stressors [53]. However, one was a weak predictor [39]. Two of the studies reported proximal factors were significant predictors of suicide risk [52,53]. Other studies focused on the individual stressors of gender-related victimisation [70,79,37] and discrimination [37] which were all significantly associated with suicide ideation and attempts. Finally, Testa et al. [91] found an indirect path between rejection and suicide ideation through internalised transphobia and negative expectations, and an indirect path between identity non-affirmation to suicide ideation through internalised transphobia. Further, they found both internalised transphobia and negative expectations were significantly correlated with suicide ideation. Identity nondisclosure, however, was not significant in any pathway.

Overall, sixteen studies examined discrimination as a distinct risk factor. Two found no correlation^{43,66}. However, fourteen reported a significant correlation between discrimination and self-harm [15,39,84,94,103,47,91,79,74,37,49,54,59,93]. A further study did not investigate a correlational relationship but reported TGD people experienced high levels of discrimination. The authors state this is the primary reason for mental health difficulties in TGD people [48], a notion supported by others [94]. As a distinct factor, victimisation was examined by eleven studies. Of these, ten reported a significant correlation between victimisation and self-harm [88, 102,91,40,54,61,75,83,98,100], and only one [104] reported no correlation. The findings presented here suggest gender-minority stressors, particularly victimisation and discrimination, are consistently significant in their impact on self-harm. Efforts to reduce these negative experiences and ensure their impact is identified and mitigated during interventions, will be key to addressing TGD self-harm.

3.5.12. Other risk factors

Race/ethnicity, income, education level, and gender identity were also examined. However, results were ambiguous. The mixed findings indicate no racial or ethnic group within the TGD community is at increased risk. Further, the heterogeneity in gender identities examined precludes further examination by gender identity. Findings also suggest income, education level, and gender identity are likely not salient risk factors for TGD self-harm or suicidality. However, because findings are mixed, we recommend researchers continue capturing these data to provide further clarity. Despite the ambiguity of findings here, clinicians should identify whether these factors are present as they may provide intervenable targets for some TGD people.

4. Discussion

This review examined and synthesised extant literature of self-harm risk and protective factors in TGD people. Clearly, TGD people experience a complex, nuanced pathway to self-harm. Three key protective (social and family support; connectedness to parents and other adults; school safety) and six risk (younger age; AFAB; depression/depressive symptoms; physical and sexual assault; drug and alcohol use; gender-minority stressors, particularly victimisation and discrimination) factors were identified. Conclusions from this review are somewhat limited due to factor heterogeneity, self-harm-related definitions, and outcome measures used. Further, replication of studies is lacking so conclusions and recommendations are made with some caution. Despite factor heterogeneity across 78 eligible studies, some crucial protective and risk factors for TGD self-harm were identified. These are important factors for clinicians to discuss with patients to create tailored, person-centred interventions [113].

4.1. Key protective factors

Protective variables presented are possible resilience factors due to their correlation with lower odds of self-harm. Social and/or family support and connectedness, especially to parents and adults, are key protective factors against TGD self-harm. This is in line with existing evidence of the protective impact of support and connectedness on TGD suicidality [28]. Family and social support may also mediate relationships between self-harm and other correlating risk factors. For example, parent connectedness has been associated with reduced substance use [62]. Therefore, encouraging and supporting TGD people to utilise existing support networks may be a key self-harm reduction strategy and reduce risky behaviours (such as substance use) associated with self-harm and wider negative health outcomes in TGD people. Additionally, family/parent counselling and support groups may foster support of TGD people, thus increasing wellbeing and addressing self-harm risk. Furthermore, TGD people lacking support (i.e., homeless; temporary housing; socially isolated; rural) need particular attention. The level and quality of existing support should be among the first factors to be established when supporting TGD people seeking help for self-harm/suicide-related behaviours. There may be differences between types of support and connectedness which should be explored in future research. For example, compared to the protective nature of parental support the impact of wider community support is less clear. This may be because negative views of TGD people differs between places or the local TGD community in included studies may be small or inaccessible which impacts how connected TGD people feel to their wider community. Understanding this will be useful to develop strategies to support TGD people and stigma-reduction programmes for the wider community.

School safety also emerged as a protective factor. These findings are supported by a recent systematic review of the role of school on LGBTQ + students' suicidal thoughts and behaviours [87]. TGD youth experience gender-identity-based hostility, victimisation, and harassment in school which cis youth do not [62]. Therefore, schools which foster a TGD-safe environment may mitigate these experiences and TGD students' self-harm risk. Creating safe spaces, being supportive of TGD students, staff/teacher training, and reducing stigma, discrimination, transphobia, and bullying in schools are strategies education settings can be implemented to engender a safe environment for their TGD students. However, findings would benefit from replication and longitudinal examination to provide a stronger evidence-base and causal effects of these protective factors. Further, these studies were all performed in the USA which may yield findings specific to the USA, or, indeed, individual US states. The presence or absence of gender-affirming school policies in other countries may yield different results and highlight the differences between different gender-affirming school policies and their impact on TGD wellbeing and self-harm.

4.2. Key risk factors

Overall, evidence from this systematic review shows younger age and people AFAB are at increased risk of self-harm/suicidality. These correlations correspond with evidence of increased risk in young people and adolescents and cis females [5] in the general population. It is interesting that increased risk is related to being AFAB, and not gender identity. Possibly, there are biological factors associated with being AFAB regardless of gender identity [26] or social learning effects relating to high rates of self-harm in people AFAB [71]. There were differences in age groups investigated. However, some studies did not specify ages, making it difficult to identify whether TGD people are at increased risk at certain ages. Future research should report age-related data in detail to evidence whether certain age-groups are at particular risk. However, the evidence presented suggests the risk for younger TGD people AFAB remains high. Drug and alcohol use is also a key factor. Substance use in TGD people is often linked to other risk factors for self-harm (i.e., victimisation [75]), so it may be a maladaptive coping mechanism employed to enable people to cope with other stressors. However, the relationship between substance use and increased self-harm and suicide outcomes is concerning. Therefore, establishing the presence of substance and alcohol use during intervention should be quickly established and may have wider benefits for TGD people.

Concerningly, TGD exposure to both physical and sexual assault are high [40], and, unsurprisingly, are key factors for TGD self-harm. TGD people face significant barriers, including further victimisation, when assaults are reported to police [90], which may further increase self-harm risk. Addressing these barriers and ensuring reported TGD assaults are taken sympathetically and seriously by police is likely to be key in reassuring TGD victims of physical and sexual assaults and may also act as a buffer against self-harm. Efforts to reduce sexual and physical assault exposure and provide resources and support are necessary to improve self-harm and wellbeing outcomes in TGD people. Also, in accord with self-harm in the general population [14], depression is a key risk factor. Depression is highly prevalent in TGD people [44,103] and often associated with other self-harm risk factors. For example, Azeem and colleagues [36] suggest the comorbidity between depression and substance (alcohol and drug) use may be due to substances being used as a maladaptive coping mechanism to combat depression and other mental health difficulties. However, while there may be temporary respite, substance use instead increases self-harm risk [36]. Consequently, substance use treatment programmes may be a good way to reduce depression and self-harm and improve wider TGD health outcomes.

Finally, gender-minority stressors (internalised transphobia, negative expectations of future events, concealment of gender identity, gender-related discrimination, rejection, victimisation, non-affirmation of gender identity) are key risk factors for self-harm in TGD people. Discrimination and victimisation are particularly important. Both are highly prevalent in TGD people [17,59], and may be linked to wider negative health outcomes [17] alongside self-harm. This is in accord with the Gender Minority Stress Model (GMS) [114] which posits the high rates of mental distress and disorders experienced by TGD people (including self-harm) relate to TGD-specific factors, such as discrimination. Consequently, TGD-specific factors may be key in understanding TGD self-harm risk [89]. Furthermore, TGD-specific factors may act as mediators between self-harm and other risk factors, such as drug and alcohol use [17]. Therefore, discrimination- and victimisation-reduction policies may be key to mitigating TGD self-harm. However, overall, studies

included in this systematic review examined general self-harm factors (e.g., depression, age). TGD people are at increased risk of self-harm and the GMS offers an explanation for this increased risk, however the current evidence-base largely focuses on general factors, not TGD-specific factors. Consequently, there is not sufficient evidence to make claims regarding the importance of TGD-specific factors to TGD self-harm. Further examination of TGD-specific factors is essential to ascertain whether TGD-specific factors explain the increased self-harm risk TGD people experience. Moreover, examining other gender-minority stressors within the GMS model (i.e., rejection, gender non-affirmation etc.) will be useful to explore the GMS model further and to establish the effects of these identity-related risk factors on TGD self-harm.

4.3. Limitations

This review identifies some important risk and protective factors for TGD self-harm which provide important intervenable targets. However, there are limitations to consider. First, that few measures are validated in TGD populations is concerning and may mean we lack a clear picture of which factors impact the self-harm pathway for TGD people. It is essential measures are developed for and validated in the populations they investigate for evaluations to be meaningful [8]. Considering this, we recommend researchers in the field commit to validating measures in TGD populations to ensure they appropriately capture TGD experiences and meaningful intervenable targets can be identified.

Second, the significant heterogeneity of factors investigated means they do not provide a robust evidence-base on which to make recommendations regarding potential intervenable targets. Further, heterogeneity meant meta-analysis of reported effect sizes was impossible. Replicating studies would further support conclusions presented here and identify the salience of other possible risk and protective factors for TGD self-harm. Additionally, TGD-specific factors are not well-researched. Therefore, the impact these have on TGD self-harm is unclear and the extant evidence is not sufficient to explain the increased self-harm risk experienced by TGD people, nor provide further support for the GMS model. We recommend research of TGD-specific self-harm factors to address this deficit in understanding.

Further, there was significant variation in self-harm-related outcome measures. This is representative of the difficulty measuring self-harm outcomes highlighted by others [115]. Moreover, the exclusion criteria and excluding grey literature possibly excluded potentially informative studies. For example, studies unavailable in English were excluded. This potentially limits the generalisability of the review findings to Western and/or English-speaking nations. Though studies from Pakistan, Lebanon, China, Hong Kong, and Dominican Republic, and others, were included and provide some generalisability. However, findings may not be generalisable to developing countries. Also, findings may not be generalisable to all TGD people as data regarding transition status and gender identity was insufficient to analyse. There may be differences between people at different stages of transition or of different gender identities. More robust evidence to clarify this may provide further opportunities for targeted support. Finally, the cross-sectional methodology employed by almost all included studies means causation cannot be determined. Future research should consider designing studies which examine causal, longitudinal, and temporal relationships between factors and self-harm outcomes. Additionally, case-control studies would provide comparisons of self-harm correlates between TGD people and the general population which would provide insight into factors distinguishing the two populations and may provide support for the GMS model and explain the disparity between self-harm risk in the general population and TGD-people.

5. Conclusion

Self-harm, and suicidal thoughts and behaviours, are common among TGD people. Investigated across 78 eligible studies, three protective and six risk factors for TGD self-harm were identified. Salient risk factors are younger age, being assigned female at birth, physical and sexual abuse, drug and alcohol use, depression or depressive symptomology, and gender-minority stressors (especially discrimination and victimisation). Protective factors are social and family support, connectedness (particularly to parents and adults), and school safety. If present, these factors provide important targets for prevention and intervention. Future research should seek to reduce heterogeneity by investigating lesser-researched factors, especially TGD-specific factors. This may identify other key factors for TGD self-harm and explore why TGD people experience increased self-harm risk. The evidence here shows TGD people experience a unique, complex pathway which needs further examination to ensure intervention is appropriate and meaningful to reduce self-harm risk in this high-risk group.

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Data availability

No data was used for the research described in the article.

CRediT authorship contribution statement

K. Bird: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **J. Arcelus:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **L. Matsagoura:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **B.A. O’Shea:** Writing – review & editing, Writing – original draft, Supervision. **E. Townsend:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices.

Appendix 1 Search strategy: TGD risk and protective factors for self-harm and suicidality

("self harm*" OR "self-harm" OR "non suicidal self injur*" OR "nonsuicidal self-injur*" OR "non-suicidal self-injur*" OR NSSI OR "self injur*" OR "self-injur*" OR "self cut*" OR "self-cut*" OR "self destruct*" OR "self-destruct*" OR "deliberate self harm" OR deliberate self-harm" OR DSH OR "self-mutilat*" OR "self mutilate*" OR "self inflicted injur*" OR "self-inflicted injur*" OR overdos* OR "suicide attempt*" OR "attempted suicid*" OR parasuicide* OR para-suicid*" OR "para suicid*"")

AND.

(transgender OR trans* OR "gender divers*" OR "non binary" OR "non-binary" OR "non-binary AND gender" OR "gender non-conforming" OR "gender non-conforming" OR "gender-queer" OR "gender queer" OR "gender fluid" OR "gender-fluid" OR "bi-gender" OR "gender creative" OR "gender neutral" OR transw* OR trans* OR "gender minorit*" OR "gender dysphoria" OR LGBT*)

Appendix 2. Gender identities under the TGD umbrella term

Gender fluid, trans, transgender, non-binary, two-spirit, omnigender, pangender, ambigender, agender, bigender, gender questioning, and gender queer. Please note this list is not exhaustive.

Appendix 3. Reasons for exclusion after full texts read

Author/s & date	Title	Reason/s for exclusion
Abramovich et al. (2020)	Assessment of Health Conditions and Health Service Use Among Transgender Patients in Canada	Did not investigate factors for self-harm (not relevant)
Albuquerque et al. (2018)	Association between violence and drug consumption with suicide in lesbians, gays, bisexuals, transvestites, and transsexuals: cross-sectional study	Data not extractable
Angoff et al. (2021)	Intersecting identities and Nonsuicidal Self-Injury Among Youth	Not relevant
Atteberry et al. (2021)	Differential Experiences of Mental Health Among Transgender and Gender-Diverse Youth in Colorado	Not relevant
Bailey et al. (2014)	Suicide risk in the UK trans population and the role of gender transition in decreasing suicidal ideation and suicide attempt	Design or analysis (qualitative analysis)
Barnett et al. (2019)	Anti-LGBT victimisation, fear of violence at school, and suicide risk among adolescents	Subpopulation not extractable (LGBT)
Beckwith et al. (2019)	Psychiatric Epidemiology of Trans & nonbinary adult patients at an urban health center	Design or analysis (suicide measured under 'psychiatric acuity' with other mental health outcomes)
Berona et al. (2020)	Predicting suicidal behavior among lesbian, gay, bisexual, and transgender youth receiving psychiatric emergency services	Subpopulation not extractable (LGBT)
Berona et al. (2021)	Predicting the Transition From Suicidal Ideation to Suicide Attempt Among Sexual and Gender Minority Youths	Subpopulation not extractable (LGBT)
Butler et al. (2019)	Self-harm prevalence and ideation in a community sample of cis, trans and other youth	Not relevant (examined prevalence rates)
Clark et al. (2023)	The role of sleep duration in suicide risk among sexual and gender minority adolescents	Subpopulation not extractable (Sexual & Gender Minority)

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Author/s & date	Title	Reason/s for exclusion
Cramer et al. (2020)	Preferences in information processing, marginalized identity, and non-monogamy-Understanding factors in suicide-related behavior among members of the alternative sexuality community	Subpopulation not extractable
de Bolger et al. (2014)	Australian Trans Men: Developmental, Sexuality, and Mental Health	Design or analysis
Del Rio-Gonzalez et al. (2021)	Sexual Orientation and Gender Identity Change Efforts and Suicide Morbidity among Gender Minority Adults in Colombia	Design (prevalence and comparison between groups)
Drakeford (2018)	Correctional Policy and Attempted Suicide Among Transgender Individuals	Examined TGD inmates
Erlangsen et al. (2023)	Transgender Identity and Suicide Attempts and Mortality in Denmark	Not relevant (examined mortality, not factors)
Freese et al. (2017)	Distinct Coping Profiles Are Associated with Mental Health Differences in Transgender and Gender Nonconforming Adults	Not relevant (Coping styles and NSSI)
Fulginiti et al. (2021)	Sexual Minority Stress, Mental Health Symptoms, and Suicidality among LGBTQ Youth Accessing Crisis Services	Subpopulation not extractable (LGBTQ)
Gibbs & Goldbach (2015)	Religious Conflict, Sexual Identity, and Suicidal Behaviors among LGBT Young Adults	Subpopulation not extractable (LGBT)
Green et al. (2021)	Association of Sexual Orientation Acceptance with Reduced Suicide Attempts among Lesbian, Gay, Bisexual, Transgender, Queer and Questioning Youth	Manuscript not available, accessible, or author/s did not respond
Gnan et al. (2019)	General and LGBTQ-specific factors associated with mental health and suicide risk among LGBTQ students	Not relevant (didn't measure factors specifically for self-harm)
Green et al. (2021)	Cumulative minority stress and suicide risk among LGBTQ Youth	Subpopulation not extractable (LGBTQ)
Hatchel et al. (2019)	Predictors of Suicidal Ideation and Attempts among LGBTQ Adolescents: The Roles of Help-Seeking Beliefs, Peer Victimization, Depressive Symptoms, and Drug Use	Subpopulation not extractable (LGBTQ)
Hatchel et al. (2019)	Peer victimisation and suicidality among LGBTQ youth: the roles of school belonging, self-compassion, and parental support	Subpopulation not extractable (LGBTQ)
Hershner et al. (2021)	Associations Between Transgender Identity, Sleep, Mental Health and Suicidality Among a North American Cohort of College Students	Not relevant (prevalence of variables between trans and cis people, and between US and Canadian students)
House et al. (2011)	Interpersonal Trauma and Discriminatory Events as Predictors of Suicidal and Nonsuicidal Self-Injury in Gay, Lesbian, Bisexual, and Transgender Persons	Subpopulation not extractable (LGBT)
Jadva et al. (2021)	Predictors of self-harm and suicide in LGBT Youth: The role of gender, socioeconomic status, bullying and school experience	Subpopulation not extractable (LGBT)
Kaniuka et al. (2019)	Stigma and suicide risk among the LGBTQ population: Are anxiety and depression to blame and can connectedness to the LGBTQ community help?	Subpopulation not extractable (LGBTQ)
Klein et al. (2023)	The Mediating Role of Family Acceptance and Conflict on Suicidality among Sexual and Gender Minority Youth	Subpopulation not extractable (LGBTQ)
Knutson et al. (2021)	Profiles of Distress and Self-Harm Among LGBTQ + Transitional Youth in a Rural State	Subpopulation not extractable (LGBTQ+)
Lee et al. (2023)	Gender Identity Change Efforts Are Associated with Depression, Panic Disorder, and Suicide Attempts in South Korean Transgender Adults	Manuscript not available, accessible, or author/s did not respond
Lee et al. (2021)	Transgender Adult's Public Bathroom-Related Stressors and their Association with Depressive Symptoms: A Nationwide Cross-Sectional Study in South Korea	Manuscript not available, accessible, or author/s did not respond
Liu et al. (2012)	Suicidal Ideation and Self-Harm in Lesbian, Gay, Bisexual, and Transgender Youth	Subpopulation not extractable (LGBT)
Lytle et al. (2018)	Suicidal and Help-Seeking Behaviors Among Youth in Online Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning Social Network	Subpopulation not extractable (LGBTQQ)
McDermott et al. (2017)	The social determinants of lesbian, gay, bisexual, and transgender youth suicidality in England: a mixed methods study	Subpopulation not extractable (LGBT)
McGraw et al. (2023)	Stigma and negative mental health outcomes in sexual/gender minority youth in Utah	Subpopulation not extractable (LGBT)
McGraw et al. (2021)	Family, Faith, and Suicidal Thoughts and Behaviors (STB) Among LGBT Youth in Utah	Manuscript not available, accessible, or author/s did not respond
Mereish et al. (2014)	Interrelationships between LGBT-Based Victimization, suicide and Substance Use Problems in a Diverse Sample of Sexual and Gender Minority Men and Women	Subpopulation not extractable (LGBT)
Moallem et al. (2022)	The relationship between sexual and gender stigma and suicide attempt and ideation among LGBTQI + populations in Thailand: findings from a national survey	Subpopulation not extractable (LGBTQI)
Morris & Galupo (2019)	"Attempting to Dull the Dysphoria": Nonsuicidal Self-Injury Among Transgender Individuals	Design (quantitative data from mixed methods is not relevant)
Patten et al. (2022)	Circumstances of Suicide Among Lesbian, Gay, Bisexual, and Transgender Individuals	Data from other sources (not individual – police, etc. after death)
Skerrett et al. (2014)	Suicides among lesbian, gay, bisexual, and transgender populations in Australia: An analysis of the Queensland Suicide Register	Subpopulation not extractable (LGBT)
Smith et al. (2019)	Longitudinal Predictors of Self-Injurious Thoughts and Behaviors in Sexual and Gender Minority Adolescents	Subpopulation not extractable (LGBT)
Speer et al. (2022)	An Intersectional Modeling of Risk for Nonsuicidal Self-Injury Among LGBTQ Adolescents	Subpopulation not extractable (LGBT)
Spivey, L. A., & Prinstein (2019)	A Preliminary Examination of the Association between Gender Nonconformity and Suicidal Thoughts and Behaviors	Subtractable population not identifiable (not clear which results pertain to GNC youth)

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Author/s & date	Title	Reason/s for exclusion
Srivastava et al. (2021)	Differential Risks for Suicidality and Mental Health Among Transgender, Nonbinary, and Cisgender Sexual Minority Youth Accessing Crisis Services	Not relevant (No measure of risk factor/self-harm outcome significance)
Turban et al. (2021)	Timing of Social Transition for Transgender and Gender Diverse Youth, K-12 Harassment, and Adult Mental Health Outcomes	Not relevant (Measured differences between age groups of TGD people)
Ugeto et al. (2022)	Differences in suicidality and psychological symptoms between sexual and gender minority youth	Subpopulation not extractable (sexual & gender minority)
Vanbronghorst et al. (2021)	Suicidality among Psychiatrically Hospitalized Lesbian, Gay, Bisexual, Transgender, Queer and/or Questioning Youth: Risk and Protective Factors	Manuscript not available, accessible, or author/s did not respond
Wang et al. (2021)	Methods of attempted suicide and risk factors in LGBTQ+ youth	Subpopulation not extractable (LGBTQ+)
Wang et al. (2021)	Suicide attempts among Taiwanese lesbian, gay, bisexual and transgender adults during the 2018 Taiwan referendum on same-sex issues	Subpopulation not extractable (LGBT)
Watson & Tatnell (2022)	Resilience and non-suicidal self-injury in LGBTQIA+	Subpopulation not extractable (LGBTQIA+)
Watts et al. (2023)	Transgender and gender expansive emerging adults: the moderating role of thwarted belongingness on mental health	Not relevant (not measuring factors for suicide or self-harm)
White et al. (2023)	Psychological distress, self-harm and suicide attempts in gender minority compared with cisgender adolescents in the UK	Not relevant (did not measure factors against self-harm specifically)

NB: Assorted studies investigated self-harm factors in TGD military veterans or prison inmates. TGD inmates [116] and veterans [117] experience unique challenges distinguishing them from the wider TGD community which may mean they experience different self-harm pathway. Consequently, these studies were excluded. Reference lists of key primary studies and review papers were searched for relevant articles.

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