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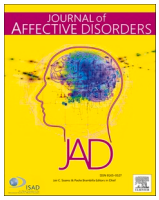
Journal of Affective Disorders 398 (2026) 121021

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad



Research paper

Characteristics of individuals from ethnic minority backgrounds who die by suicide: A systematic review

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ARTICLE INFO

Keywords:
Suicide
Indigenous
Migrants
Ethnic minority groups

ABSTRACT

We aimed to estimate the prevalence of clinical and modifiable sociodemographic characteristics of individuals from ethnic minority backgrounds who died by suicide and, where possible, compare them to the majority population. Databases were searched for studies published between 01/01/2000–19/12/2023. Absolute and relative prevalence estimates of characteristics were reported by minority group (Indigenous; migrant; other ethnic minority) then stratified by continent and, where applicable, migrant sub-type and ethnicity. A narrative synthesis was conducted with moderate-high quality studies. We identified fifty-seven studies across 16 countries; the majority from North America, Europe and Oceania. When examining moderate-high quality evidence, there were generally limited numbers of studies reporting the prevalence of each characteristic by ethnic minority status, especially for social factors. Based on the available data, we found a high prevalence mental health problems among people who died by suicide from Indigenous (20.8–60.7 %), migrant (37.2–42.9 %) and other ethnic minority (29.9–37.3 %) backgrounds. However, people from Asian/Pacific Islander, Black and Hispanic backgrounds were less likely to have mental health problems reported compared to majority populations. Indigenous people and migrants generally had lower contact with mental health services compared to majority groups. We also found evidence of a lower prevalence of depression and higher prevalence of alcohol and substance use problems among Indigenous compared to non-Indigenous individuals, and greater levels of economic disadvantage among migrants compared to non-migrants. Our findings highlight differences in the

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https://doi.org/10.1016/j.jad.2025.121021
Received 2 July 2025; Received in revised form 20 November 2025; Accepted 19 December 2025
Available online 26 December 2025

characteristics of people who die by suicide based on ethnicity and migration status and identify potential targets for research and suicide prevention strategies.

1. Introduction

Suicide is an important public health issue, with over 720,000 people dying by suicide every year worldwide (WHO, 2024). Evidence suggests that suicide rates vary by ethnicity and migrant status. The ethnic minority groups with the highest risk of suicide varies across countries (CDCP, 2024; ONS, 2023). Furthermore, worldwide, people from Indigenous backgrounds have higher rates of suicide compared to the majority population (Troya et al., 2022). The picture for those who migrate from one country to another is mixed, and across all studies, there is a lack of data on suicide among ethnic minority groups in low- and middle-income countries (LMICs) (Troya et al., 2022).

Suicide is highly influenced by socio-cultural factors (Durkheim, 1897/1951). Risk factors for suicide in one setting or community may not be relevant in another. Mental illness, for example, is strongly associated with suicide in high-income countries, but is thought to be less prevalent in LMICs (Knipe et al., 2019). The interplay between migration, mental health and suicide is a complex one; a previous systematic review did not find evidence of a difference in suicide rates among migrants compared to the majority population (Troya et al., 2022). However, there is evidence that some migrant populations, including those who are psychiatric inpatients, as well as refugees, are at a higher risk of suicide compared to those from the host population (Bevione et al., 2024; Knipe et al., 2019) thus suggesting that specific types of migratory experiences and psychiatric morbidity might confer higher risk.

Indigenous, migrant and other ethnic minority individuals are likely to have had different histories and life experiences and may be entitled to different rights in some contexts. Equally, these groups are likely to share some common risk factors for self-harm and suicidality, such as racism, acculturation, mental health stigma, poor access to mental healthcare, social isolation and socioeconomic deprivation (Bowden et al., 2020; Coimbra et al., 2022; Geulayov et al., 2022; Motillon-Toudic et al., 2022; Schomerus et al., 2015; Tadmon and Bearman, 2023). Homogeneous grouping of individuals from these groups is inappropriate and granular investigations are needed to support suicide prevention (Troya et al., 2022).

Previous systematic reviews examining antecedents or characteristics of suicide deaths among ethnic minority groups have been restricted to specific areas such as Latin America (Azuero et al., 2017; de Souza et al., 2020; Dickson et al., 2019). One previous systematic review of factors associated with suicidality among culturally and linguistically diverse communities did not examine suicide mortality separately from other suicidal behaviours (Bowden et al., 2020). An umbrella review focused on refugees and asylum seekers identified four systematic reviews that examined suicide mortality, however, did not describe any characteristics of suicides apart from gender (Bevione et al., 2024).

We analysed data from a previous systematic review on suicide rates among people from ethnic minority groups (Troya et al., 2022) and updated the search to identify new data, to examine the clinical and modifiable socio-demographic characteristics of these individuals. At points throughout we refer to “suicide deaths”; while person-first terminology is preferred, this shorthand is purely for brevity.

2. Methods

This review was conducted following the PRISMA guidelines (Page et al., 2021) and the protocol registered in advance (PROSPERO CRD42021254841).

2.1. Search strategy and selection criteria

We utilised the searches from a previous systematic review (Troya et al., 2022) which searched Medline, Embase and PsycInfo for studies published between 1st January 2000 and 3rd July 2020 with English language abstracts (S1, Table 1). Title/abstracts and full texts were double screened using our inclusion and exclusion criteria (Table 1). References of included studies were screened and study authors of all eligible or potentially eligible papers published from 2015 onwards were contacted to request additional information.

Full-text articles of non-English papers were assessed using Google Translate or a native speaker where possible. A random selection of full-text articles were pilot screened to ensure consistency among reviewers. Two reviewers (GC and SG) independently screened each full text using Rayyan (Mourad Ouzzani et al., 2016) and another reviewer (DK) resolved discrepancies. Data were extracted independently in duplicate by GC and JF/HA using a pre-piloted data extraction form for each included paper. Data extracted are listed in S1, Table 3. Quality (risk of bias) assessment was conducted at the same time as data extraction using the Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies (Institute JB, 2017) and we used a set of predefined criteria to assess whether a study was considered to be of moderate-high quality (see S1, Table 4). Any conflicts were resolved by a third reviewer (MIT/DK). Assessments were made based on the information presented in the papers. Because outcome ascertainment was a criterion in the quality assessment, some studies were given more than one quality rating depending on how characteristics were measured.

Searches were updated on the 19th December 2023. Title and abstracts were single screened, and DK independently reviewed 5 % of screened articles with good agreement between reviewers (Kappa = 0.75), with most disagreements resulting from DK being more exclusive. Full-text screening and data extractions were completed by GC, and two reviewers assessed quality (GC and MIT). Excluded full texts and reasons are listed in S2.

Finally, we excluded studies from the review which (if included) would have risked data duplication due to overlapping years of data collection from the same data source.

2.2. Post-hoc changes to eligibility criteria

To improve comparability across studies and better inform conclusions, we decided post-hoc to limit the review to studies that reported on general adult populations only (i.e. excluding studies that exclusively reported on specific age (e.g. young or older people) or gender subgroups).

2.3. Data analysis

Primary outcomes were absolute prevalence estimates of clinical and modifiable sociodemographic characteristics among migrants and individuals from ethnic minority backgrounds who died by suicide. For characteristics with multiple categories, e.g. various levels of educational attainment, we used the category conveying the most disadvantage, e.g. lowest level of educational attainment. Where the necessary data were not presented, we back calculated from available data where possible. All statistical analyses were conducted using Stata18 (StataCorp, 2023). Secondary outcomes were relative estimates of clinical and modifiable sociodemographic characteristics among migrants and individuals from ethnic minority backgrounds who died by suicide, compared to the majority population. We calculated odds ratios using the *cci* command in Stata and the cornfield approximation for

confidence intervals (Brown, 1981).

For each characteristic, data were presented within three main groups, according to ethnic minority status: a) Indigenous; b) migrant; or c) other ethnic minority groups (Table 2). We then stratified data within each group by continent of residence. For migrant and other ethnic minority groups, we stratified by ethnicity where data were available (Asian, Black, Hispanic, Middle Eastern, White, other/unspecified). For migrant groups, we further stratified by specific migration status where data were available (undocumented migrant, asylum seeker, refugee, economic migrant, other/unspecified). In the case where multiple studies reported the same data, or there was a risk of data overlap based on data source and years of data collection, data were selected for inclusion based on the following hierarchy: 1) study quality (moderate-high quality studies prioritised), 2) sample size (study reporting the highest number of suicide deaths prioritised).

Characteristics which were reported by a minimum of five studies in any main group (Indigenous, migrant or other ethnic minority groups) were included in a summary table. These included studies of any quality rating. To reduce risk of bias, we planned to only include studies rated moderate-high quality in the narrative synthesis and meta-analysis. Meta-analyses were planned for all characteristics which had five or more moderate-high quality studies reporting prevalence estimates in any main group (Indigenous, migrant or other ethnic minority groups).

Table 2
Definitions used in this review.

Term	Definition
Ethnic minority groups	A group of individuals who share a common sense of identify and characteristics (e.g., language, religion, tribe, nationality, race) but are a group who are in a non-dominant position in a given country. The definition used in this paper includes migrants and Indigenous peoples as well as other ethnic minority groups (United Nations, 2015).
Indigenous groups	Those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them; they form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions, and legal system (United Nations, 2015).
Migrant groups	Those who are currently living in a different country to the one in which they were born. We did not specify a duration in which an individual needed to be resident in the host country (as per some definitions (Migration Observatory, 2024)) as this information is rarely reported in research papers.
Other ethnic minority groups	Ethnic minority groups which do not fall under the category of Indigenous or migrant groups, for example, Asian, Black, Hispanic.
Clinical characteristics	Any characteristic related to health or healthcare.
Non-modifiable sociodemographic characteristics	Any demographic or social characteristic that could potentially be changed by an intervention. We considered characteristics related to education, employment, financial status, interpersonal relationships, legal issues and various life events. We did not include sex, gender or age.

3. Results

We identified 57 studies that met our inclusion criteria (Fig. 1, Table 3). Over half ($n = 31$, 54.4 %) of the studies were conducted in North America, followed by Europe ($n = 12$, 21.1 %), Oceania ($n = 8$, 14.0 %), Asia ($n = 4$, 7.0 %), South America (n = 1, 1.8 %) and Africa (n = 1, 1.8 %). Most studies were cases series ($n = 40$, 70.2 %) and the number of suicide deaths reported in each study ranged from 14 to 553,912. Twenty-three (40.4 %) studies reported data for other ethnic minority groups, 18 (31.6 %) for Indigenous groups, 11 (19.3 %) for migrant groups and 5 (8.8 %) for a combination of Indigenous and other ethnic minority groups. Of the studies reporting data on migrant groups, 4 (36.4 %) reported data specifically on refugees and 1 (9.1 %) specifically on asylum seekers. The number of characteristics reported by each study ranged from 1 to 47. The clinical and non-modifiable characteristics reported in each study are listed in S1, Table 6.

3.1. Quality assessment

Most ($n = 36$, 63.2 %) studies were rated as low quality. Five (8.8 %) studies were rated as high quality, 13 (22.8 %) were moderate quality and three (5.3 %) studies were given more than one quality rating depending on how characteristics were measured (S1, Table 5) (Ali et al., 2021; Choi et al., 2019; Goodfellow et al., 2020). Below, we present data for characteristics that were reported by five or more studies in any main group (Indigenous, migrant, other ethnic minority); data from all studies are reported in Table 4 and findings from moderate-high quality studies are discussed in the text. It was not possible to perform a meta-analysis as no characteristics had five or more moderate-high quality studies in any main ethnic minority group. Characteristics

Table 1
Inclusion and exclusion criteria.

Criteria for the systematic review
Inclusion criteria:
• All epidemiological studies providing individual-level data on one or more of the clinical and modifiable sociodemographic characteristics. • General population setting (i.e., non-clinical populations or specific subgroups in any country).
Exclusion criteria:
• Full text of study not available. • Studies for which English translation could not be sought. • Papers published before January 2000. • Reviews, letters, abstracts, dissertations, and studies which have not been peer-reviewed. • Studies not reporting data on migrants or individuals from ethnic minority backgrounds. • Clinical populations or specific subgroups (e.g. specific occupations, students, pregnant people, LGBTQ+ individuals). • Studies only reporting non-fatal self-harm (e.g., attempted suicide). • Studies not reporting on decedents' characteristics of interest. • Studies which did not present characteristics stratified by migrant status or ethnicity or where relevant data was otherwise not extractable (e.g. not presenting individual-level data). • Studies for which their inclusion would risk data duplication. • Added post-hoc: Studies which did not report on general adult populations (i.e. those that only report on age (e.g. young or older people) or gender subgroups).

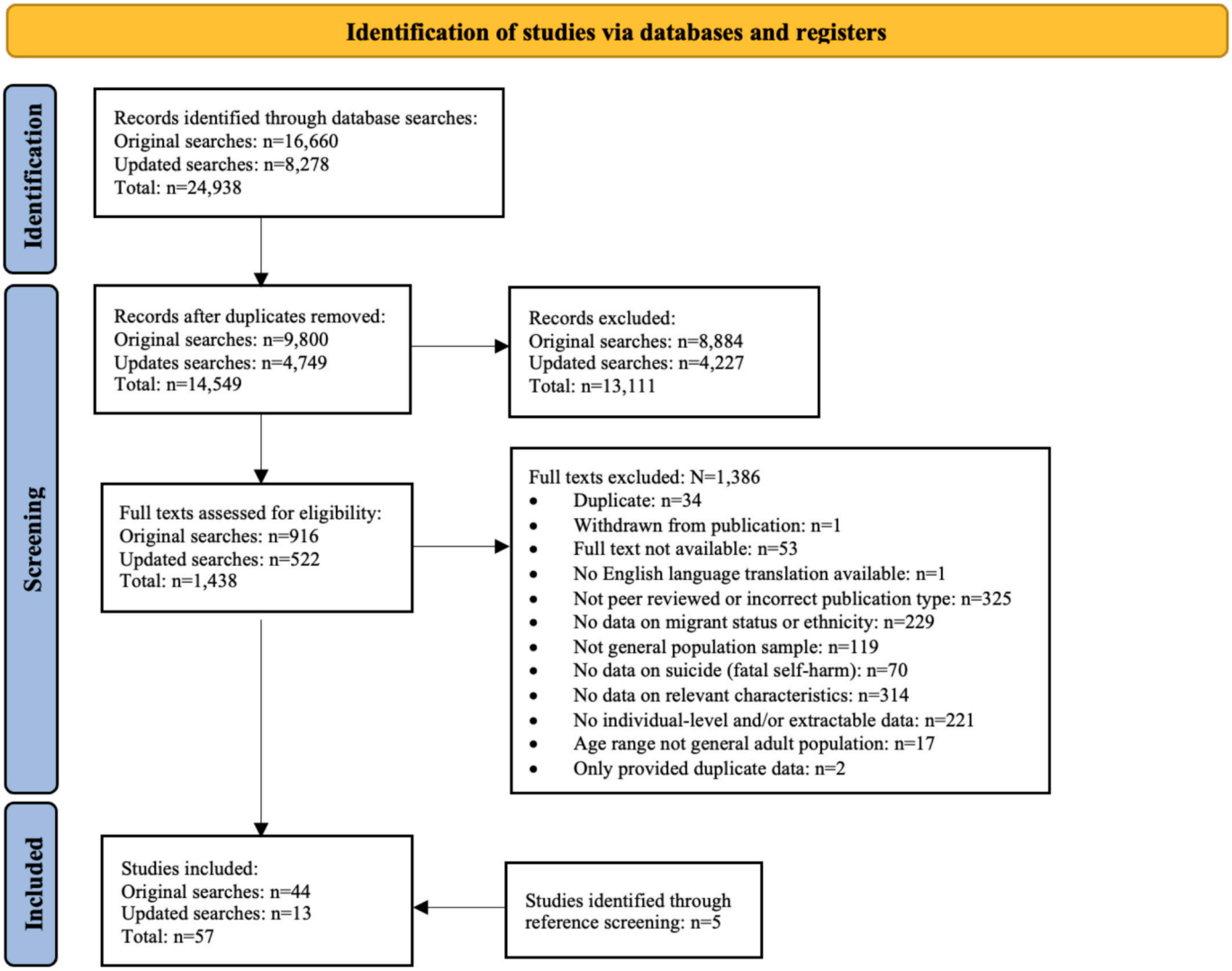

Fig. 1. Study selection (PRISMA) diagram.

reported by fewer than five studies in any main group are listed in S1, Table 7, and the data for all characteristics is presented in S2.

3.2. Clinical characteristics

3.2.1. General mental health problems

Fourteen studies reported the prevalence of general mental health problems (not one specific diagnosis), five of which were rated moderate-high quality. People from Indigenous and other minority groups who died by suicide were generally less likely to have a mental health problem than those in majority populations, though findings varied by setting.

Three moderate-high quality studies reported general mental health problems among Indigenous suicide deaths. Mental health problems were generally less common in suicide deaths by Indigenous individuals (Table 4). A study from the United States found that the prevalence of mental health problems among American Indian/Alaskan Native suicide deaths (24.5 %) was nearly half that among White suicide deaths (43.1 %) (OR 0.43 95 % CI 0.38–0.48, $p < 0.01$) (Ali et al., 2021). Among Indigenous populations in Oceania, the prevalence of any psychiatric diagnosis ranged from 20.8 % in Queensland, Australia (De Leo et al., 2012) to 60.7 % in a smaller study in New Caledonia (Goodfellow et al., 2020). In the Australian study, the prevalence of any psychiatric diagnosis was lower compared to the non-Indigenous group (42.5 %, OR 0.36 95 % CI 0.28–0.45 $p < 0.01$) (De Leo et al., 2012) but there was no statistical evidence of a difference in the New Caledonian study (63.6 %, OR 0.88 95 % CI 0.28–2.75 $p = 0.83$) (Goodfellow et al., 2020). Notably, the latter was conducted in a setting where the Indigenous population form a larger minority of the population (Goodfellow et al., 2020).

Two European studies reported data for migrant suicides. In a Swedish study, over a third (37.2 %) of refugee suicide deaths had a mental disorder, however the prevalence was no different among non-migrant suicide deaths (32.6 %; OR 1.22 95 % CI 0.93–1.61 $p = 0.15$) (Björkenstam et al., 2020). A case series conducted in a single London borough identified that three of the seven (42.9 %) Irish migrants who had died by suicide had a history of psychiatric illness (Ougrin et al., 2010).

In a study reporting other ethnic minority suicides in the United States (US), the prevalence of mental health problems among Asian or Asian/Pacific Islander (37.3 %), Black (29.9 %) and Hispanic (33.0 %) suicide deaths was lower compared to White (43.1 %) suicide deaths (Asian or Asian/Pacific Islander vs White: OR 0.79 95 % CI 0.71–0.87 $p < 0.01$; Black vs White: OR 0.56 95 % CI 0.53–0.59 $p < 0.01$; Hispanic vs White: OR 0.65 95 % CI 0.61–0.69 $p < 0.01$) (Ali et al., 2021).

3.2.2. Depression

Sixteen studies reported the prevalence of depression, three of which were rated moderate-high quality. Overall, the evidence pointed

Table 3
Summary of included studies.

Author Year published Country	Year/s data collected Study design Database or source (if applicable)	Total no. suicide deaths reported in the study	Exposure Ethnic minority group (Majority group, if reported) If reported by exposure: Age (years) Gender (% female)	Exposure ascertainment How ethnic minority or migrant status was ascertained	Quality assessment
Abe et al., 2006 2006 United States	1988–2002 Case series	1132	Black: 13 % (White: 24 %) All ages included	Unclear	Low quality
Affleck et al., 2020 2020 Canada	2003–2006 Case-control study	92	Indigenous: mean age 23.2, 14 % female All ages included	Living in a particular region	Low quality
Affleck et al., 2021 2021 Canada	2014–2018 Case-control study	63	Indigenous: "average age around 25 years", 16 % female All ages included	Living in a particular region	Low quality
Ali et al., 2021 2019 United States	2006–2015 Case series NVDRS	116,456	American Indian/Alaskan Native: mean age 33.4, 22.2 % female Asian/Pacific Islander: mean age 41.1, 33.3 % female Black: mean age 37.6, 17.7 % female Hispanic: mean age 36.7, 19.4 % female (White: mean age 47.9, 22.6 % female) Study population age range: 10 years and above	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Mental health problem = moderate quality; Other characteristics = low quality
Alothman et al., 2022 2021 United Kingdom	2001–2019 Case-control study Clinical Practice Research Datalink, Hospital Episode Statistics, Office for National Statistics National Mortality Records	14,515	Asian, Black, Mixed, Other (White) Study population age range: 15 years and above	Electronic health records	Moderate quality
Amin et al., 2021 2019 Sweden	2000–2003, 2005–2008, 2010–2013 Cohort study The Longitudinal Database for Integration Studies	9144	Refugees: 23.0 % female (Swedish-born: 28.9 % female) Study population age range: 16–64 years	National registers	High quality
Beaudoin et al., 2018 2018 Canada	2003–2006 Case-control study	30	Indigenous: 16.7 % female, mean age 23.9 All ages included	Unclear	Low quality
Björkenstam et al., 2020 2020 Sweden	2005–2013 Cohort study The Longitudinal Database for Integration Studies	9142	Refugees (Swedish-born) Study population age range: 16–64 years	National registers	High quality
Boothroyd et al., 2001 2001 Canada	1982–1996 Case-control study	71	Indigenous: 12 % female, mean age 23.1 years	Living in a particular region	Low quality
Burrows et al., 2013 2013 Canada	1989–2007 Case series Quebec Health Ministry Vital Statistics Files	18,967	Anglophones: 24.7 % female (Francophones: 23.1 % female) Study population age range: 10 years and above	Language used as a proxy measure of ethnicity	Low quality
Caetano et al., 2013 2013 United States	2003–2009 Case series NVDRS	59,384	American Indian/Alaskan Native: 22.3 % female Asian/Pacific Islander: 34.4 % female Black: 22.3 % female Hispanic: 16.7 % female (White): 22.0 % female All ages included	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Moderate quality
Campbell et al., 2016 2016 Australia	2005–2014 Case series	125	Indigenous: 27.2 % female All ages included	Unclear	Low quality
Castle et al., 2004 2004 United States	1993 Case series 1993 National Mortality Followback Survey	1429	Black: 12.0 % female (White: 30.0 % female) Total sample age range: 15 years and above	Unclear	Low quality
Chachamovich et al., 2015	2003–2006 Case-control study	120	Indigenous: 17.5 % female, mean age 23.4 years (SD 9.1)	Unclear	Low quality

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Table 3 (*continued*)

Author Year published Country	Year/s data collected Study design Database or source (if applicable)	Total no. suicide deaths reported in the study	Exposure Ethnic minority group (Majority group, if reported) If reported by exposure: Age (years) Gender (% female)	Exposure ascertainment How ethnic minority or migrant status was ascertained	Quality assessment
2015 Canada					
Choi et al., 2019 2019 United States	2005–2015 Case series NVDRS	13,384	Black: 44.7 % female, mean age 41.6 years (SD 12.4) Hispanic: 62.7 % female, mean age 41.0 (SD 14.1) (White: 48.9 % female, mean age 47.9 (SD 14.1)) Study population age range: 15 years and above	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Mental health problem = moderate quality; Other characteristics = low quality
Choi et al., 2024 2023 United States	2017–2019 Case series NVDRS	92,805	Asian/Pacific Islander, Black, Hispanic, Other (White) Study population age range: 18 years and above	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Low quality
Cohen, 2008 2008 United Kingdom	1997–2005 Case series	38	Asylum seekers:4.5 % female, mean age 31 years, age range 18–79 years	Unclear	Low quality
Cwik et al., 2016 2016 United States	2001–2012 Case series	70	Indigenous: 34.0 % female, mean age 22.6 years (SD 8.9)	Unclear	Low quality
De Leo et al., 2012 2012 Australia	1994–2007 Case series Queensland Suicide Register	7126	Indigenous: 18.3 % female (non-Indigenous: 21.1 % female) Ages not reported	Interviews with knowledgeable informants	Moderate quality
Goldberger and Haklai, 2021 2021 Israel	2000–2017 Cohort	3434	Arab (Jewish or Other) Study population age range: 25–64 years	Unclear	Low quality
Goodfellow et al., 2020 2020 New Caledonia	2014–2015 Case series	52	non-Indigenous: 40.9 % female, mean age 41 (Indigenous: 52.6 % female, mean age 26 years)	Interviews with knowledgeable informants	Axis I mental disorders = high quality; Other characteristics = low quality
Hagaman et al., 2016 2016 United States	2009–2012 Case series	14	Refugees: 36.0 % female, age range 18 years and above	Unclear	Low quality
Huguet et al., 2012 2012 United States	2005–2008 Case series NVDRS	30,293	Black: 16.6 % female, median age 36 (White: 22.5 % female, median age 47 years) All ages included	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Low quality
Hayati et al., 2004 2004 Malaysia	1999 Case series	76	Chinese: 27.5 % female Indian 27.3 % female Other: 40.0 % female (Malay: 22.2 % female) Total sample mean age: 43 years	Pathologist's notes, and where available, the medical and psychiatric case notes	Low quality
Joe et al., 2007 2007 United States	1993 Case series 1993 National Mortality Followback Survey	1616	Black: 11.9 % female (White: 21.9 % female) Study population age range: 18 years and above	Death certificates	Low quality
Jonsson et al., 2022 2022 Sweden	2006–2016 Cohort The Longitudinal Database for Integration Studies	12,474	Refugees: 20.3 % female non-refugee migrants: 35.7 % female (non-migrants: 28.8 % female) Study population age range: 20–64 years	National registers	High quality
Jordan and McNiel, 2019 2019 United States	2005–2013 Case series NVDRS	73,490	Indigenous, Asian/Pacific Islander, Black, Hispanic, Other/ Multiracial	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law	Low quality

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Table 3 (*continued*)

Author Year published Country	Year/s data collected Study design Database or source (if applicable)	Total no. suicide deaths reported in the study	Exposure Ethnic minority group (Majority group, if reported) If reported by exposure: Age (years) Gender (% female)	Exposure ascertainment How ethnic minority or migrant status was ascertained	Quality assessment
			(White) Study population age range: 18–89 years	enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	
Kar, 2016 2016 United Kingdom	2004–2011 Case series	146	Asian (White) Total sample age range: 16–88, mean age 46 years	Coroner	Moderate quality
Karch et al., 2006 2006 United States	2004 Case series NVDRS	6865	Black, Hispanic, Non-Hispanic Other (White) No age or gender data presented	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Low quality
Kennedy et al., 2021 2021 Australia	2009–2015 Case series Victorian Suicide Register	1298	Indigenous (non-Indigenous) Total sample mean age: 46.9 years	Unclear	Low quality
Kõlves et al., 2006a 2006 Estonia	1999 and 2002–2003 Case-control study	419	Migrants: 24.0 % female, mean age 45.1 (non-migrants: 16.8 % female, mean age 50.5 years)	Unclear	Low quality
Kõlves et al., 2006b 2006 Estonia	1999 Case-control study	427	Migrants: mean age 45.3 (non-migrants: mean age 50.5 years)	Unclear	Low quality
Kung et al., 2005 2005 United States	1993 Case-control study 1993 National Mortality Followback Survey	702	Black: 11.5 % female (White: 32.4 % female) Study population age range: 15–64 years	Death certificates	Low quality
Laliberté and Tousignant, 2009 2009 Canada	2002 Case series	30	Indigenous: 10.0 % female, median age 25, age range 17–56 years	Living in an Aboriginal community	Low quality
Law et al., 2014 2014 Australia	2001–2008 Case series National Coroners' Information System	5541	Migrants: 25.3 % female, 32,2 % aged <40 (non-migrants: 20.2 % female) Age range: 15 years and above	Coroner	Moderate quality
Leung and Lai, 2023 2023 United States	2008–2018 Case series NVDRS	4209	Asian/Pacific Islanders: 31.4 % female, mean age 42.6 years (SD 18.0) Sample age range: 18–103 years	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Moderate quality
Liu et al., 2011 2010 Taiwan	1979–1981 Case-control study	113	Indigenous (non-Indigenous) Sample age range: 15 years and above	Unclear	Low quality
Loh et al., 2007 2007 Singapore	2001–2002 Case series	640	Malay, Indian, Other (Chinese) All ages included	Unclear	Low quality
Miller et al., 2021 2021 United States	2003–2017 Case series NVDRS	203,157	American Indian/Alaskan Native, Asian, Black, Hispanic, Other (White) Study population age range: 10 years and above	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	Moderate quality
Moore et al., 2022 2022 United States	2015–2017 Case series NVDRS	61,962	Black, Hispanic, Other (White) No age range specified	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law	Moderate quality

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Table 3 (*continued*)

Author Year published Country	Year/s data collected Study design Database or source (if applicable)	Total no. suicide deaths reported in the study	Exposure Ethnic minority group (Majority group, if reported) If reported by exposure: Age (years) Gender (% female)	Exposure ascertainment How ethnic minority or migrant status was ascertained	Quality assessment
				enforcement reports (from the injury/ death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports	
Øien-Ødegaard et al., 2019 2019 Norway	2006–2014 Case series Norwegian Population Register	4341	Migrants: 26.8 % female (Norwegian-born with Norwegian-born parents: 29.2 % female) Study population age range: 15 years and above	National registers	Low quality
Ougrin et al., 2010 2010 United Kingdom	2005–2008 Case series Public Mortality Files	54	Migrants (non-migrants) All ages included	Public Mortality Files	High quality
Paiva de Araujo et al., 2023 2023 Brazil	2000–2020 Case series Mortality Information System	208,110	Indigenous: 26.7 % female. Study population age range: 10 years and above	Assigned by medico-legal doctors by visual inspection and interviews with the family of the deceased	Low quality
Patel et al., 2022 2022 United States	2000–2018 Case series National Center for Health Statistics	553,912	Black, Other (White) Study population age range: 20–64 years	Death certificates	Low quality
Puzo et al., 2018 2018 Norway	1992–2012 Case-control study Central Population Register	11,409	Migrants (non-migrants) All ages included.	National registers	High quality
Rockett et al., 2009 2009 United States	1999–2003 Case series	145,846	Black: 16.6 % female Hispanic: 14.7 % female (White: 20.0 % female) Study population age range: 15 years and above	Unclear	Low quality
Rockett et al., 2010 2010 United States	2003–2005 Case series	92,218	Black: 18.0 % female Hispanic: 15.5 % female (White: 20.8 % female) Study population age range: 15 years and above	Unclear	Low quality
Saunders et al., 2019 2019 Canada	2003–2012 Cohort study Immigration Refugee and Citizenship Canada Permanent Resident Database	6484	Migrants: 40.0 % female (Long-term residents: 24.9 % female) Study population age range: 18 years and above	National database	Moderate quality
Stark et al., 2010 2010 South Africa	2003–2007 Case series	469	White: 19.8 % female (Black: 17.2 % female) All ages included	Police and state mortuary archives	Moderate quality
Styka et al., 2010 2010 United States	2005–2006 Case series New Mexico Violent Death Reporting System	526	Indigenous, Hispanic (White) Study population age range: 18–64 years	Unclear	Low quality
Sumarokov et al., 2014 2014 Russia	2002–2012 Case series	252	Indigenous 19.4 % female (non-Indigenous 13.0 % female) Study population age range: 10 years and above	Passports and medical records at local primary care units	Moderate quality
Sveticic et al., 2012 2012 Australia	1994–2007 Case series Queensland Suicide Register	7126	Indigenous 21.1 % female (non-Indigenous) 18.3 % female. No age data provided.	Police forms, coroner's findings, postmortem reports, toxicology reports, psychological autopsy	Low quality
Tiatia-Seath et al., 2017 2017 New Zealand	1996–2013 Case series	9307	Indigenous female 22.4 % All ages included. Note: some of the Indigenous people were also migrants (non-Indigenous: 24.4 % female)	Unclear	Low quality
Truong et al., 2023 2023 Australia	2016 Case series Victorian Suicide Register	652	People of culturally and linguistically diverse backgrounds: 27.0 % female All ages included	The VSR consists of information from documents generated in the course of the coroner's investigation, including medical records, police records, autopsy and toxicology reports, statements from family members and friends and clinicians, and (in completed investigations) the coroner's finding.	Moderate quality
Vannoy et al., 2016	2000–2011 Case series	10,082	Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian/Pacific	Death certificates	Moderate quality

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Table 3 (*continued*)

Author Year published Country	Year/s data collected Study design Database or source (if applicable)	Total no. suicide deaths reported in the study	Exposure Ethnic minority group (Majority group, if reported) If reported by exposure: Age (years) Gender (% female)	Exposure ascertainment How ethnic minority or migrant status was ascertained	Quality assessment
2016 United States			Islander, Mexican/Chicano/Hispanic, Samoan, Black, Native American, Other Non-White, Unknown/Not stated Non-White (White) Total sample age range: 15–93 years		
Wissow et al., 2001 2001 United States	1990–1993 Case series	23	Indigenous: 13.0 % female Study sample age range: 13–53 years	Death certificates	Low quality
Wong et al., 2017 2017 United States	2003–2013 Case series NVDRS	92,754	Non-Hispanic Asian/Pacific Islanders: 32.9 % female, mean age 41.5 (SD 18.0) Age range not specified	The National Violent Death Reporting System (NVDRS). The NVDRS. information from death certificates, coroner/medical examiners and law enforcement reports (from the injury/death scene, ongoing investigations, or family/friend accounts) and, when available, crime lab and toxicology reports.	Low quality

towards a lower prevalence of depression among Indigenous suicides compared to non-Indigenous suicides.

Among Indigenous suicide deaths in Queensland, Australia, the prevalence of current unipolar depression was considerably lower (7.4 %) compared to the majority population (28.7 %, OR 0.20 95 % CI 0.14–0.28 p < 0.01) (De Leo et al., 2012). In a smaller Oceanian study from New Caledonia, the prevalence of current major depressive episode was lower among Indigenous compared to non-Indigenous suicide deaths, however there was no statistical evidence of a difference (17.2 % vs 36.4 %; OR 0.36 95 % CI 0.10–1.23 $p = 0.12$) (Goodfellow et al., 2020). The same study did provide weak statistical evidence of a lower prevalence of past major depressive episode (3.3 % vs 19.0 %, OR 0.15 95 % CI 0.00–1.09 p = 0.06) (Goodfellow et al., 2020). The latter was conducted in a setting where the Indigenous population form a larger minority of the population (Goodfellow et al., 2020).

In contrast, a Swedish study found that refugees who died by suicide were more likely to have depressive disorders compared to non-migrants (13.7 % vs 9.6 %, OR 1.50 95 % CI 1.02–2.20 $p = 0.04$) (Björkenstam et al., 2020).

3.2.3. Alcohol/substance use

Nineteen studies reported the prevalence of alcohol and/or substance use, five of which were rated moderate-high quality and reported mixed findings.

One study in Queensland, Australia, found that problematic alcohol use (58.5 % vs 41.3 %, OR 2.00 95 % CI 1.66–2.42 $p < 0.01$) and substance use disorders (5.1 % vs 3.1 %, OR 1.71 95 % CI 1.11–2.63 $p = 0.01$) were higher among Indigenous suicide deaths compared to the majority (De Leo et al., 2012). Another Oceanian study, in New Caledonia, found the prevalence of alcohol- and other substance use disorders was higher among Indigenous compared to non-Indigenous suicide deaths but there was no statistical evidence of a difference (alcohol: 40.0 % vs 22.7 %, OR 2.27 95 % CI 0.68–7.50 $p = 0.19$; substances: 34.5 % vs 22.7 %, OR 1.79 95 % CI 0.52–6.0 4 p = 0.40)) (Goodfellow et al., 2020). The latter was conducted in a setting where the Indigenous population form a larger minority of the population (Goodfellow et al., 2020).

The prevalence of alcohol/substance misuse among migrant suicide deaths in Europe ranged from 12.0 % for substance misuse disorders among refugees in Sweden (Björkenstam et al., 2020) to 42.9 % for alcohol misuse among Irish migrants in London (Ougrin et al., 2010). No difference was observed between refugees and non-migrants in the Swedish study (16.6 %, OR 0.68 95 % CI 0.46–1.02 p = 0.07) (Björkenstam et al., 2020).

In a US study, the prevalence of alcohol problems and substance abuse were relatively low among Asian American/Pacific Islander suicide deaths (7.7 % and 7.1 %, respectively) (Leung and Lai, 2023).

3.2.4. Mental health treatment or mental health/primary health service contact

Seventeen studies reported the prevalence of mental health treatment or mental health/primary health service contact prior to suicide, five of which were rated moderate-high quality. Indigenous people and migrants who died by suicide generally had lower engagement with mental health services than majority groups, though findings varied by region and care measure reported.

One study from Queensland, Australia found that Indigenous individuals who died by suicide were roughly half as likely to have received treatment for mental illness in their lifetime compared to the majority population (Oceania: 23.8 % vs 43.3 %, OR 0.41 95 % CI 0.33–0.51 $p < 0.01$) (De Leo et al., 2012). A US study reporting data from Washington State found no statistical difference in the prevalence of mental health evaluation between Indigenous (11.4 %) and White (11.1 %) suicide deaths (OR 1.04 95 % CI 0.66–1.57 $p = 0.87$) (Vannoy et al., 2016).

In a small London-based study, only around two thirds of Irish migrants who died by suicide were registered with a General Practitioner or known to mental health services, whereas almost all non-migrants were (62.5 % vs 95.5 %, OR 0.08 95 % CI 0–0.53 $p < 0.01$) (Ougrin et al., 2010).

Two studies, from Europe and Oceania, reported varying prevalence rates of mental health evaluation or service contact among Asian/Pacific Islander individuals who died by suicide; in a case series from Washington State, US, 10.6 % had received a mental health evaluation (Vannoy et al., 2016) and in a case series from Wolverhampton, United Kingdom, 30.0 % were known to mental health services (Kar, 2016). Both studies provided a comparison with those from the majority population and did not find evidence of a difference in mental health treatment/health service use (11.1 %, OR 0.96 95 % CI 0.68–1.35 $p = 0.81$ (Vannoy et al., 2016); 41.1 %, OR 0.48 95 % CI 0.17–1.37 p = 0.18 (Kar, 2016)).

The study conducted in Washington State, US, found that people who

Table 4
Summary of prevalence estimates for each characteristic.

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
Clinical Characteristics			
General mental health problems	Studies reporting general mental health problems: n = 8 Studies excluded due to data duplication: n = 1 - Styka et al. (2010) Studies included: n = 7 North America Indigenous: • Affleck et al. (2020): 45.7 % (43/92) • Affleck et al. (2021): MH problems at the following ages (years): 10–14: 17.5 % (11/63), 15–19: 28.8 % (17/59), 20–24: 21.1 % (8/38), 25–29: 13.0 % (3/23), 30–34: 11.8 % (2/17), 35–39: 16.7 % (2/12), 40–44: 33.3 % (3/9) • **Ali et al. (2021): 24.5 % (376/1533)** • Boothroyd et al. (2001): 23.5 % (12/63) • Laliberté and Tousignant (2009): 20.0 % (6/30) Majority group (White): • **Ali et al. (2021): 43.1 % (43,223/100,285)** Oceania Indigenous: • **De Leo et al. (2012): 20.8 % (98/470)** • **Goodfellow et al. (2020): 60.7 % (17/28)** Majority group (non-Indigenous): • **De Leo et al. (2012): 42.5 % (2829/6650)** • **Goodfellow et al. (2020): 63.6 % (14/22)**	Studies reporting general mental health problems: n = 3 Studies excluded due to data duplication: n = 0 Studies included: *n* = 3 Europe Asylum seekers: • Cohen (2008): 81.8 % (18/22) Refugees: • **Björkenstam et al. (2020): 37.2 % (84/226)** Other/unspecified migrant group: • **Ougrin et al. (2010): 42.9 % (3/7)** Majority group (non-migrants): • **Björkenstam et al. (2020): 32.6 % (2905/8916)**	Studies reporting general mental health problems: *n* = 10 Studies excluded due to data duplication: n = 5 - **Choi et al. (2019)**, Huguet et al. (2012), Rockett et al. (2010), Styka et al. (2010), Wong et al. (2017) Studies included: *n* = 5 Asia Asian or Asian/Pacific Islander: • Loh et al. (2007): Not possible to extract exact numbers. "Some 90 % of suicide victims with a prior diagnosis of psychiatric illness were Chinese (majority ethnic group)". • Hayati et al. (2004): Documentation of a psychiatric illness: Chinese 3/12 (25.0 %), Malay 1/12 (8.3 %) North America Asian or Asian/Pacific Islander: • **Ali et al. (2021): 37.3 % (641/1719)** Black: • **Ali et al. (2021): 29.9 % (2171/7262)** • Karch et al. (2006): 34.7 % (174/501) • Rockett et al. (2009): 5.4 % (504/9390) Hispanic: • **Ali et al. (2021): 33.0 % (1867/5657)** • Karch et al. (2006): 21.4 % (55/257) • Rockett et al. (2009): 4.1 % (372/9174) Other ethnic groups: • Karch et al. (2006): 31.0 % (96/310) Majority ethnic group (White): • **Ali et al. (2021): 43.1 % (43,223/100,285)** • Karch et al. (2006): 44.2 % (2562/5797) • Rockett et al. (2009): 10.0 % (12,729/127282)
Depression	Studies reporting depression: *n* = 9 Studies excluded due to data duplication: n = 1 - Styka et al. (2010) Studies included: *n* = 8 Asia Indigenous: • Liu et al. (2011): 85.0 % (51/60) Majority group (Han Taiwanese): • Liu et al. (2011): 94.3 % (50/53) North America Indigenous: • Ali et al. (2021): 29.5 % (452/1533) • Boothroyd et al. (2001): 13.2 % (9/68) • Chachamovich: 60.83 % (73/120) • Cwik et al. (2016): 4.8 % (1/21)	Studies reporting depression: n = 3 Studies excluded due to data duplication: n = 0 Studies included: *n* = 3 Europe Asylum seekers: • Cohen (2008): 50.0 % (11/22) Refugees: • **Björkenstam et al. (2020): 13.7 % (31/226)** Majority group (non-migrants): • **Björkenstam et al. (2020): 9.6 % (855/8916)** North America Refugees: • Hagaman et al. (2016): 60.0 % (3/5)	Studies reporting depression: *n* = 8 Studies excluded due to data duplication: n = 3 - Choi et al. (2019), Huguet et al. (2012), Styka et al. (2010) Studies included: *n* = 5 North America Asian or Asian/Pacific Islander: • Ali et al. (2021): 37.8 % (650/1719) Black: • Abe et al. (2006): 42.0 % (147/348) • Ali et al. (2021): 25.2 % (1830/7262) • Karch et al. (2006): 21.6 % (108/501) • Kung et al. (2005): 16.7 % (13/78) • Rockett et al. (2009): 2.4 % (224/9390) Hispanic:

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Table 4 (*continued*)

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
	• Laliberté and Tousignant (2009): 13.3 % (4/30) Majority group (White): • Ali et al. (2021): 36.3 % (36,403/100,285) Oceania Indigenous: • **De Leo et al. (2012): 7.4 % (35/470)** • **Goodfellow et al. (2020): current: 17.2 % (5/29); past: 3.3 % (1/30)** Majority group (non-Indigenous): • **De Leo et al. (2012): 28.7 % (1909/6650)** • **Goodfellow et al. (2020): current: 36.4 % (8/22); past: 19.0 % (4/21)**		• Ali et al. (2021): 36.5 % (2065/5657) • Karch et al. (2006): 15.6 % (40/257) • Rockett et al. (2009): 1.7 % (152/9174) Other ethnic groups: • Karch et al. (2006): 24.2 % (75/310) Majority group (White): • Abe et al. (2006): 63.0 % (495/784) • Ali et al. (2021): 36.3 % (36,403/100,285) • Karch et al. (2006): 34.7 % (2012/5797) • Kung et al. (2005): 37.4 % (246/624) • Rockett et al. (2009): 5.8 % (7382/127282)
Alcohol or substance use	Studies reporting alcohol/substance abuse: *n* = 13 Studies excluded due to data duplication: n = 4 - Affleck et al. (2020), Beaudoin et al. (2018), Styka et al. (2010), Sveticic et al. (2012) Studies included: n = 9 Asia Indigenous: • Liu et al. (2011): substances: 50.0 % (30/60) Majority group (Han Taiwanese): • Liu et al. (2011): substances: 18.9 % (10/53) North America Indigenous: • Affleck et al. (2021): lifetime: 77.8 % (49/63), current: 76.2 % (48/63) • Ali et al. (2021): alcohol: 25.0 % (383/1533), substances: 13.8 % (212/1533) • Boothroyd et al. (2001): alcohol: 45.1 % (32/71), solvents: 33.8 % (24/71), other substances: 23.9 % (17/71) • Chachamovich et al. (2015): cannabis: 59.1 % (71/120), alcohol: 44.2 % (53/120) • Laliberté and Tousignant (2009): alcohol: 93.3 % (28/30), illegal drugs: 95.8 % (23/24), cocaine 50.0 % (12/24) • Wissow et al. (2001): alcohol: 83.3 % (15/18) Majority group (White): • Ali et al. (2021): alcohol: 16.5 % (16,547/100,285), substances: 14.0 % (14,040/100,285) • Oceania Indigenous: • **De Leo et al. (2012): alcohol: 58.5 % (275/470), substances: 5.1 % (24/470)** • **Goodfellow et al. (2020): alcohol: 40.0 % (12/30), substances 34.5 % (10/29)** Majority group (non-Indigenous): • **De Leo et al. (2012): alcohol: 41.3 % (2746/6650), substances: 3.1 % (203/6650)** • **Goodfellow et al. (2020): alcohol 22.7 % (5/22), substances 22.7 % (5/22)**	Studies reporting alcohol/substance abuse: n = 6 Studies excluded due to data duplication: n = 1 - Kõlves et al., 2006a Studies included: n = 5 Europe Asylum seekers: • Cohen (2008): 14.0 % (3/22) Refugees: • **Björkenstam et al. (2020): 12.0 % (27/226)** Other/unspecified migrant group: • Kõlves et al. (2006b): 64.7 % (118/183) • **Ougrin et al. (2010): alcohol: 42.9 % (6/7)** Majority group (non-migrants): • **Björkenstam et al. (2020): 16.6 % (1476/8916)** • Kõlves et al. (2006b): 58.0 % (142/244) North America Refugees: Hagaman et al. (2016): substances: 16.7 % (2/12), alcohol: 21.4 % (3/14)	Studies reporting alcohol/substance abuse: n = 10 Studies excluded due to data duplication: n = 4 - Choi et al. (2019), Huguet et al. (2012), Kung et al. (2005), Styka et al. (2010) Studies included: n = 6 Note: Ali et al. (2021) excluded for Asian or Asian/Pacific Islander due to data duplication. North America Asian or Asian/Pacific Islander: • **Leung and Lai (2023): alcohol: 7.7 % (326/4209), substances: 7.1 % (299/4209)** Black: • Abe et al. (2006): substances: 8.0 % (29/384) • Ali et al. (2021): alcohol 7.3 % (530/7262), substances: 10.2 % (741/7262) • Castle et al. (2004): alcohol: 12.0 % (18/150), cocaine: 16.7 % (25/150), marijuana:16.7 % (25/150), stimulants: 2.7 % (4/150) • Karch et al. (2006): alcohol: 8.6 % (43/501), substances: 14.6 % (73/501) • Rockett et al. (2009): alcohol: 1.4 % (128/9390), substances: 0.8 % (78/9390) Hispanic: • Ali et al. (2021): alcohol: 17.4 % (984/5657), substances: 15.6 % (882/5657) • Karch et al. (2006): alcohol: 19.1 % (49/257), substances: 17.1 % (44/257) • Rockett et al. (2009): alcohol: 1.4 % (130/9174), substances: 0.5 % (49/9174) Other ethnic groups: • Karch et al. (2006): alcohol: 17.4 % (54/310), substances: 10.3 % (32/310) Majority group (White): • Abe et al. (2006): substances: 13.0 % (99/784) • Ali et al. (2021): alcohol: 16.5 % (16,547/100,285), substances: 14.0 % (14,040/100,285) • Castle et al. (2004): alcohol: 30.7 % (392/1279), cocaine: 5.6 % (72/1279), marjuana: 12.5 % (160/1279), stimulants: 4.5 % (57/1279) • Karch et al. (2006): alcohol: 17.5 % (1014/5797), substances: 14.0 % (812/5797)

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Table 4 (*continued*)

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
			• Rockett et al. (2009): alcohol: 2.6 % (3360/127282), substances: 0.8 % (1019/127282)
Mental health treatment or mental health/ primary health service contact	Studies reporting mental health treatment/ service use: n = 10 Studies excluded due to data duplication: n = 2 - Styka et al. (2010), Sveticic et al. (2012) Studies included: n = 8 Asia Indigenous: • Liu et al. (2011): 46.7 % (28/60) Majority group (Han Taiwanese): • Liu et al. (2011): 68.0 % (36/53) North America Indigenous: • Ali et al. (2021): 15.9 % (244/1533) • Beaudoin et al. (2018): consultations: 50.0 % (15/30), hospitalisations: 23.3 % (7/30) • Boothroyd et al. (2001): 15.4 % (10/65) • **Vannoy et al. (2016): 11.4 % (26/228)** • Wissow et al. (2001): 13.0 % (3/23) Majority group (White): • Ali et al. (2021): 29.9 % (29,985/100,285) • **Vannoy et al. (2016): 11.1 % (981/8870)** Oceania Indigenous: • Campbell et al. (2016): 30.0 % (31/102) • **De Leo et al. (2012): 23.8 % (112/470)** • Majority group (non-Indigenous): • **De Leo et al. (2012): 43.3 % (2879/6650)**	Studies reporting mental health treatment/ service use: n = 3 Studies excluded due to data duplication: n = 0 Studies included: *n* = 3 Europe Other/unspecified migrant group: • **Ougrin et al. (2010): 62.5 % (20/32)** • Øien-Ødegaard et al. (2019): 68.6 % (253/369) Majority group (non-migrants): • **Ougrin et al. (2010): 95.5 % (21/22)** • Øien-Ødegaard et al. (2019): 77.8 % (3092/3972) North America Refugees: • Hagaman et al. (2016): 14.3 % (2/14)	Studies reporting mental health treatment/ service use: *n* = 11 Studies excluded: *n* = 5 - Choi et al. (2019), Huguet et al. (2012), Kung et al. (2005), Styka et al. (2010), Wong et al. (2017) Studies examined: n = 6 Europe Asian or Asian/Pacific Islander: • **Kar (2016): 30.0 % (6/20)** Majority group (White): • **Kar (2016): 47.1 % (32/68)** North America Asian or Asian/Pacific Islander: • Ali et al. (2021): 24.7 % (425/1719) • **Vannoy et al. (2016): 10.6 % (38/357)** Black: • Abe et al. (2006): 8.0 % (29/384) • Ali et al. (2021): 17.9 % (1300/7262) • Joe et al. (2007): 17.5 % (28/160) • Karch et al. (2006): 26.0 % (130/501) • **Vannoy et al. (2016): 11.9 % (27/226)** Hispanic: • Ali et al. (2021): 21.3 % (1205/5657) • Karch et al. (2006): 16.3 % (42/257) • **Vannoy et al. (2016): 10.0 % (34/341)** Other ethnic groups: • Karch et al. (2006): 23.2 % (72/310) • **Vannoy et al. (2016): 100.0 % (1/1)** Majority group (White): • Ali et al. (2021): 29.9 % (29,985/100,285) • Abe et al. (2006): 13.0 % (105/784) • Joe et al. (2007): 29.1 % (410/1408) • Karch et al. (2006): 33.1 % (1919/5797) • **Vannoy et al. (2016): 11.1 % (981/8870)**
Previous suicide attempt/ s	Studies reporting previous suicide attempt/s: n = 9 Studies excluded due to data duplication: n = 2 - Styka et al. (2010), Sveticic et al. (2012) Studies included: n = 7 North America Indigenous: • Affleck et al. (2020): 42.4 % (39/92) • Boothroyd et al. (2001): 19.1 % (12/63) • Jordan and McNiel (2019): 24.6 % (218/885) • Laliberté and Tousignant (2009): 53.3 % (16/30) • Wissow et al. (2001): 52.6 % (10/19) White (majority group): • Jordan and McNiel (2019): 21.4 % (13,430/62,794) Oceania Indigenous: • **De Leo et al. (2012): 25.7 % (121/470)**	Studies reporting previous suicide attempt/s: *n* = 2 Studies excluded due to data duplication: n = 0 Studies included: *n* = 2 Europe Refugees: • **Amin et al. (2021): 7.5 % (17/226)** • Majority group (non-migrants) • **Amin et al. (2021): 7.7 % (683/8918)** North America Refugees: • Hagaman et al. (2016): 21.4 % (3/14)	Studies reporting previous suicide attempt/s: n = 6 Studies excluded due to data duplication: Choi et al. (2019), Huguet et al. (2012), Styka et al. (2010) Studies included: n = 3 Note: Jordan and McNiel (2019) excluded for Asian or Asian/Pacific Islander due to data duplication. North America Asian or Asian/Pacific Islander: • **Leung and Lai (2023): 17.3 % (730/4209)** Black: • Jordan and McNiel (2019): 15.9 % (631/3972) • Karch et al. (2006): 13.4 % (67/501) Hispanic:

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Table 4 (*continued*)

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
	• Goodfellow et al. (2020): lifetime: 20.0 % (6/30); 12 months prior to death: 6.7 % (2/30) Majority group (non-Indigenous): • **De Leo et al. (2012): 29.5 % (1962/6650)** • Goodfellow et al. (2020): lifetime: 25.0 % (5/20); 12 months prior to death: 21.2 % (4/19)		• Jordan and McNiel (2019): 24.0 % (809/3370) • Karch et al. (2006): 16.7 % (43/257) Other ethnic groups: • Jordan and McNiel (2019): 19.7 % (479/2427) • Karch et al. (2006): 17.1 % (53/310) Majority group (White): • Jordan and McNiel (2019): 21.4 % (13,430/62,794) • Karch et al. (2006): 18.7 % (1084/5797)
Death by suicide in a loved one	Studies reporting death by suicide in a loved one: n = 6 Studies excluded due to data duplication: n = 1 - Affleck et al. (2020) Studies included: n = 5 <u>North America</u> Indigenous: • Chachamovich et al. (2015): 29.5 % (35/120) • Cwik et al. (2016): 0.0 % (0/21) • Laliberté and Tousignant (2009): 53.3 % (16/30) • Styka et al. (2010): 9.8 % (4/41) White (majority group): • Styka et al. (2010): 3.4 % (10/298) <u>Oceania</u> Indigenous: • Goodfellow et al. (2020): 33.3 % (10/30) • Majority group (non-Indigenous): • Goodfellow et al. (2020): 20.0 % (4/20)	Studies reporting death by suicide in a loved one: n = 1 Studies excluded due to data duplication: n = 0 Studies included: *n* = 1 <u>North America</u> Refugees: • Hagaman et al. (2016): 21.4 % (3/14)	Studies reporting death by suicide in a loved one: n = 3 Studies excluded due to data duplication: Styka et al. (2010) Studies included: n = 2 <u>North America</u> Black: • Abe et al. (2006): 0.29 % (1/348) • Choi et al. (2019): 4.1 % (27/665) Hispanic: • Choi et al. (2019): 7.8 % (43/554) Majority group (White): • Abe et al. (2006): 3.4 % (27/784) • Choi et al. (2019): 7.7 % (879/11624)
Modifiable Socio-demographic Characteristics			
Relationship problems	Studies reporting relationship problems: n = 7 Studies excluded due to data duplication: n = 1 - Styka et al. (2010) Studies included: n = 6 <u>North America</u> Indigenous: • Affleck et al. (2021): Unspecified relational difficulties at the following ages (years): 10–14: 1.6 % (1/63), 15–19: 18.6 % (11/59), 20–24: 18.4 % (7/38), 25–29: 4.3 % (1/23), 30–34: 5.9 % (1/17). Relational difficulties with spouse at the following ages (years): 20–24: 26.3 % (10/38), 25–29: 52.2 % (12/23), 35–39: 25.0 % (3/12), 40–44: 11.1 % (1/9) • Ali et al. (2021): 32.4 % (497/1533) • Beaudoin et al. (2018): 90.0 % (27/30) • Boothroyd et al. (2001): 19.7 % (14/71) • Cwik et al. (2016): 33.3 % (7/21) • Laliberté and Tousignant (2009): 73.3 % (22/30) Majority group (White): • Ali et al. (2021): 25.2 % (25,272/100,285)	Studies reporting relationship problems: *n* = 0	Studies reporting relationship problems: n = 8 Studies excluded due to data duplication: n = 4 - Choi et al. (2019), Huguet et al. (2012), Styka et al. (2010), Wong et al. (2017) Studies included: *n* = 4 Note: Ali et al. (2021) and Choi et al. (2024) excluded for Asian or Asian/Pacific Islander due to data duplication. <u>North America</u> Asian or Asian/Pacific Islander: • **Leung and Lai (2023): 0.3 % (11/4209)** Black: • Ali et al. (2021): 28.2 % (2048/7262) • Abe et al. (2006): 29.0 % (101/384) • Choi et al. (2024): intimate partner conflicts: 22.1 % (1273/5754), other interpersonal conflicts: 6.9 % (399/5754) Hispanic: • Ali et al. (2021): 35.6 % (2014/5657) • Choi et al. (2024): intimate partner conflict: 29.7 % (2041/6868), other interpersonal conflicts: 7.6 % (524/6868) Other ethnic groups: • Choi et al. (2024): intimate partner conflict: 30.6 % (680/2227), other interpersonal conflicts: 9.9 % (222/2227) Majority group (White): • Ali et al. (2021): 25.2 % (25,272/100,285)

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Table 4 (*continued*)

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
			• Abe et al. (2006): 24.0 % (191/784) • Choi et al. (2024): intimate partner conflicts: 23.2 % (17,516/75357), other interpersonal conflicts: 8.0 % (6062/75357)
Financial status and deprivation	Studies reporting financial problems: $n = 6$ Studies excluded due to data duplication: $n = 1$ - Styka et al. (2010) Studies included: n = 5 North America Indigenous: • Affleck et al. (2021): Financial losses at the following ages (years): 15–19: 5.1 % (3/59), 20–24: 2.6 % (1/38), 25–29: 0.0 % (0/23), 30–34: 52.9 % (9/17), 35–39: 50.0 % (6/12), 40–44: 66.7 % (6/9) • Ali et al. (2021): 4.9 % (75/1533) • Beaudoin et al. (2018): 80.0 % (24/30) • Laliberté and Tousignant (2009): 20.0 % (6/30) Majority group (White): • Ali et al. (2021): 10.5 % (10,530/100,285) Oceania Indigenous: • Tiatia-Seath et al. (2017): 57.4 % (216/376) • Majority group (non-Indigenous): • Tiatia-Seath et al. (2017): 23.6 % (2096/8882)	Studies reporting financial problems: $n = 5$ Studies excluded due to data duplication: $n = 0$ Studies included: n = 5 Europe Refugees: ● **Jonsson et al. (2022): 41.2 % (75/182)** ● Other/unspecified migrant group: ● **Jonsson et al. (2022): 38.0 % (566/1490)** ● Kõlves et al. (2006a): 25.1 % (44/175) ● **Puzo et al. (2018): 57.6 % (292/507)** Majority group (non-migrants or unspecified): • **Jonsson et al. (2022): 26.4 % (2843/10,751)** • **Puzo et al. (2018): 54.2 % (5239/9659)** • Kõlves et al. (2006a): 26.0 % (63/242) North America Refugees: • Hagaman et al. (2016): 71.4 % (10/14) Other/unspecified migrant group: • **Saunders et al. (2019): 45.4 % (59/130** Majority group (long-term residents): • **Saunders et al. (2019): 24.2 % (1523/6292)**	Studies reporting financial problems: $n = 8$ Studies excluded due to data duplication: $n = 3$ - Choi et al. (2019), Styka et al. (2010), Wong et al. (2017) Studies included: n = 5 Europe Asian or Asian/Pacific Islander: • **Alothman et al. (2022): Asian vs White OR 0.42 (0.34–0.51)** • Black: • **Alothman et al. (2022): Black vs White OR 0.50 (0.42–0.61)** Mixed: • **Alothman et al. (2022): Mixed vs White OR 1.02 (0.77–1.34)** Other ethnic groups: • **Alothman et al. (2022): Other vs White OR 0.71 (0.55–0.94)** North America Asian or Asian/Pacific Islander: • Ali et al. (2021): 10.5 % (180/1719) Black: • Abe et al. (2006): 13.0 % (45/348) • Ali et al. (2021): 7.4 % (537/7262) • Joe et al. (2007): 70.6 % (113/160) Hispanic: • Ali et al. (2021): 8.3 % (470/5657) Other ethnic groups: • Burrows et al. (2013): high material deprivation: 68.5 % (50/72), high social deprivation: 68.5 % (50/72) Majority group (White): • Abe et al. (2006): 18.0 % (139/784) • Ali et al. (2021): 10.5 % (10,530/100,285) • Joe et al. (2007): 52.4 % (738/1480) Majority Group (other): • Burrows et al. (2013): high material deprivation: 67.7 % (840/1240), high social deprivation: 67.7 % (840/1240)
Unemployment and other work-related problems	Studies reporting unemployment: n = 8 Studies excluded due to data duplication: $n = 2$ - Beaudoin et al. (2018), Styka et al. (2010) Studies included: $n = 6$ Europe Indigenous: • **Sumarokov et al. (2014): employer or employee 62.7 % (42/67), other employment status 37.3 % (25/67)**	Studies reporting unemployment: $n = 4$ Studies excluded due to data duplication: n = 0 Studies included: n = 4 Europe Refugees: • **Amin et al. (2021): unemployment: 26.1 % (59/226); no sickness absence 85.4 % (193/226), sickness absence 1–90 net days 6.2 %**	Studies reporting other work-related problems: n = 6 Studies excluded due to data duplication: n = 3 - Choi et al. (2019), Styka et al. (2010), Wong et al. (2017) Studies included: n = 3 Note: Ali et al. (2021) excluded for Asian or Asian/Pacific Islander due to data duplication. North America

(*continued on next page*)

Table 4 (*continued*)

Characteristics reported by 5 or more studies in any main group	Prevalence estimates stratified by minority groups		
	Indigenous groups	Migrant groups	Other ethnic minority groups
	Majority group (non-Indigenous): • **Sumarokov et al. (2014): employer or employee 63.8 % (118/185), other employment status 36.2 % (67/185)** North America Indigenous: • Affleck et al. (2021): professional difficulties at the following ages (years): 15–19: 1.7 % (1/59), 20–24: 23.7 % (9/38), 25–29: 4.3 % (1/23), 30–34: 0.0 % (0/17), 35–39 0.0 % (0/12), 40–44: 11.1 % (1/9) • Ali et al. (2021): 5.9 % (90/1533) • Chachamovich et al. (2015): 45.0 % (54/120) • Cwik et al. (2016): 0.0 % (0/21) • Laliberté and Tousignant (2009): 90.0 % (27/30) Majority group (White): • Ali et al. (2021): 11.5 % (11,533/100,285)	**(14/226), sickness absence > 90 net days 8.4 % (19/226)** Other/unspecified migrant group: • Kölves et al. (2006a): 26.3 % (46/175) Majority group (non-migrants): • **Amin et al. (2021): unemployment: 16.7 % (1490/8918); no sickness absence 78.5 % (7003/8918), sickness absence 1–90 net days 9.0 % (804/8918), sickness absence > 90 net days 12.5 % (1111/8918)** • Kölves et al. (2006a): 19.3 % (47/244) North America Refugees: • Hagaman et al. (2016): no regular income 71.4 % (10/14), unable to find work 28.% (4/14) Oceania Other/unspecified migrant group: • **Law et al. (2014): 55.4 % (820/1481)** • Majority group (non-migrants): • **Law et al. (2014)): 55.2 % (1790/3242)**	Asian or Asian/Pacific Islander: • **Leung and Lai (2023): 11.4 % (480/4209)** Black: • Ali et al. (2021): 9.0 % (654/7262) Hispanic: • Ali et al. (2021): 10.3 % (583/5657) Majority group (White): • Ali et al. (2021): 11.5 % (11,533/100,285) Africa White: • **Stark et al. (2010): 37.2 % (45/121)** Majority group (Black): • **Stark et al. (2010): 63.9 % (216/338)**
Criminal or legal problems	Studies reporting legal problems: $n = 7$ Studies excluded due to data duplication: $n = 1$ - Styka et al. (2010) Studies included: n = 6 North America Indigenous: • Affleck et al. (2021): legal difficulties at the following ages (years): 15–19: 18.6 % (11/59), 20–24: 26.3 % (10/38), 25–29: 26.1 % (6/23), 30–34: 5.9 % (1/17), 25–39: 0.0 % (0/12), 40–44: 0.0 % (0/9) • Ali et al. (2021): 12.0 % (184/1533) • Boothroyd et al. (2001): 11.3 % (8/71) • Chachamovich et al. (2015): 52.5 % (63/120) • Cwik et al. (2016): 0.0 % (0/21) • Laliberté and Tousignant (2009): 29.6 % (8/27) Majority group (White): • Ali et al. (2021): 7.9 % (7923/100,285)	Studies reporting legal problems: n = 1 Studies excluded due to data duplication: n = 0 Studies included: n = 1 North America Refugees: • Hagaman et al. (2016): 0.0 % (0/14)	Studies reporting legal problems: n = 6 Studies excluded due to data duplication: n = 2 - Ali et al. (2021), Choi et al. (2019) Studies included: n = 4 Note: Ali et al. (2021) excluded from Black and Hispanic due to data duplication. North America Asian or Asian/Pacific Islander: • Ali et al. (2021): 7.0 % (120/1719) Black: • Abe et al. (2006): 7.0 % (24/348) • Castle et al. (2004): 11.3 % (17/150) • **Moore et al. (2022): 3.3 % (119/3642)** Hispanic: • **Moore et al. (2022): 3.6 % (134/3767)** • Styka et al. (2010): Recent criminal legal problem: 12.4 % (22/177), Other legal problem: 7.9 % (14/177) Other ethnic group: • **Moore et al. (2022): 1.9 % (54/2808)** Majority group (White): • Ali et al. (2021)*: 7.9 % (7923/100,285) • Abe et al. (2006): 7.0 % (54/784) • Castle et al. (2004): 9.8 % (125/1279) • **Moore et al. (2022)*: 1.3 % (678/51745)** • Styka et al. (2010)*:Recent criminal legal problem: 13.8 % (41/289), Other legal problem: 8.1 % (24/298) *Note: there is a risk of data duplication between Ali et al. (2021), **Moore et al. (2022)** and Styka et al. (2010) in the Majority group (White).

died by suicide from Black and Hispanic backgrounds had similar rates of mental health evaluation (Black: 11.9 %; Hispanic 10 %) (Vannoy et al., 2016). No difference was observed between these groups compared to the White population (11.1 %) (Black vs White OR 1.09 95 % CI 0.73–1.64 $p = 0.67$; Hispanic vs White OR 0.89 95 % CI 0.62–1.27 $p = 0.53$).

3.2.5. Previous suicide attempt/s

Twelve studies reported the prevalence of previous suicide attempt/s, three of which were rated moderate-high quality. History of suicide attempts was generally similar between minority and majority populations. One study from Queensland, Australia, found no difference in the prevalence of a lifetime history of suicide attempt among Indigenous (25.7 %) and majority (29.5 %) suicide deaths (OR 0.83 95 % CI 0.67–1.03 p = 0.08) (De Leo et al., 2012). A Swedish study also found no difference in a history of suicide attempts among refugees (7.5 %) compared to non-migrants (7.7 %) (OR 0.98 95 % CI 0.60–1.61 p = 0.94) (Amin et al., 2021). One study reported the prevalence among Asian/Pacific Islander populations in the US to be 17.3 % (Leung and Lai, 2023) but did not provide a comparison to the general population.

3.3. Modifiable socio-demographic characteristics

3.3.1. Relationship problems

Nine studies reported the prevalence of relationship problems, one of which was rated moderate-high quality. This study from the US reported a prevalence of 0.3 % for interpersonal violence victimisation among Asian/Pacific Islander suicide deaths (Leung and Lai, 2023).

3.3.2. Financial status and deprivation

Fourteen studies reported the prevalence of financial status or deprivation, four of which were rated moderate-high quality, and the findings were mixed.

In a Swedish study, refugee (41.2 %) and non-refugee migrant (38.0 %) suicide deaths were more likely to be in the lowest quintile of disposable income compared to the non-migrants (16.4 %) (refugee: OR 1.95 95 % CI 1.45–2.62 $p < 0.01$; non-refugee migrants: OR 1.70 95 % CI 1.52–1.91 p < 0.01) (Jonsson et al., 2022). Another European study from Norway found no difference in the annual gross income between migrants and non-migrants in the lowest income category (57.6 % vs 54.2 %, OR 1.15 95 % CI 0.96–1.37 $p = 0.14$) (Puzo et al., 2018). In a Canadian study, migrants who died by suicide were more likely to live in deprived areas (45.4 % vs 24.2 %, OR 2.60 95 % CI 1.84–3.69 p < 0.01) (Saunders et al., 2019).

A study from the United Kingdom found that, compared to the majority, individuals from Asian (OR 0.42 95 % CI 0.34–0.51), Black (OR 0.50 95 % CI 0.42–0.61) and other ethnic (OR 0.71 95 % CI 0.55–0.94) backgrounds who died by suicide were less likely to be socioeconomically disadvantaged, but this association was not observed for individuals of mixed ethnic backgrounds (OR 1.02 95 % CI 0.77–1.34) (Alothman et al., 2022).

3.3.3. Unemployment and other work-related problems

Twelve studies reported the prevalence of unemployment or other job problems, four of which were rated moderate-high quality, and the findings were mixed. In a Russian study, there was no evidence of a difference in the prevalence of unemployment among Indigenous compared to non-Indigenous suicide deaths (37.3 % vs 36.2 %; OR 1.05 95 % CI 0.59–1.86 $p = 0.87$) (Sumarokov et al., 2014).

One study from Sweden reported a higher prevalence of unemployment among refugee (26.1 %) compared to non-migrant (16.7 %) suicide deaths (OR 1.76 95 % CI 1.30–2.38 $p < 0.01$) (Amin et al., 2021). This differed to other/unspecified migrants who died by suicide in Australia, where no differences were found with non-migrants (55.4 %; OR 1.01 95 % CI 0.89–1.14 p = 0.92) (Law et al., 2014). The same Swedish study reported that refugees who died by suicide were less likely to have taken sick leave compared to non-migrants (85.4 % vs 78.5 %, OR 1.60 95 % CI 1.10–2.32 p = 0.01) (Amin et al., 2021).

In urban South Africa, the prevalence of unemployment among people who died by suicide from a White ethnic minority background was much lower than the majority Black population (37.2 % vs 63.9 %, OR 0.33 95 % CI 0.22–0.51 p < 0.01) (Stark et al., 2010).

In Asian/Pacific Islander individuals who died by suicide in the US, the prevalence of job problems was 11.4 % (Leung and Lai, 2023).

3.3.4. Criminal or legal problems

Eleven studies reported the prevalence of criminal or legal problems, one of which (a study from the US) was rated moderate-high quality and suggested a discrepancy in incarceration rates. The proportion of suicide deaths occurring among individuals who were incarcerated at the time of fatal injury was higher in Black (3.3 %), Hispanic (3.6 %) and other ethnic minority groups (1.9 %) compared with the majority (White) population (1.3 %) (Black: OR 2.54 95 % CI 2.09–3.10 $p < 0.01$; Hispanic: OR 2.78 95 % CI 2.30–3.35 p < 0.01; other: OR 1.48 95 % CI 1.12–1.95 p < 0.01) (Moore et al., 2022).

3.4. Gaps in the literature

Table 5 shows the number of studies reported by each characteristic within each ethnic minority group and quality rating, thereby highlighting gaps in the literature.

4. Discussion

Based on evidence from 57 studies from 16 countries, we found a lack of high-quality data reporting clinical or modifiable sociodemographic characteristics of people who died by suicide from ethnic minority backgrounds. There was particularly a paucity of data for migrant groups, social characteristics, and studies from outside of North America, Europe and Oceania. Based on the moderate-high quality data available, we identified high prevalence rates of mental health problems among suicide deaths from Indigenous (20.8–60.7 %), migrant (37.2–42.9 %) and other ethnic minority (29.9–37.3 %) backgrounds. However, compared to those from the majority population, people who died by suicide from Asian/Pacific Islander, Hispanic and Black backgrounds were less likely to have mental health problems reported, and there was some evidence of a lower prevalence among Indigenous individuals. We also highlight evidence that the prevalence of depression among Indigenous suicide deaths is lower compared to non-Indigenous, whereas the prevalence of alcohol and substance use problems might be higher for this group. Indigenous people and migrants who died by suicide generally had lower contact with mental health services than majority groups. Finally, we found evidence that migrants who die by suicide may have faced higher levels of unemployment and economic disadvantage compared to non-migrants.

Previous reviews have identified that a history of self-harm or mental illness are significant risk factors for suicide (Favril et al., 2022; Moitra et al., 2021). The prevalence of previous suicide attempts in our review varied across ethnic groups; 25.7 % for Indigenous individuals, 7.5 % for migrants, and 17.3 % for Asian/Pacific Islander individuals. Where comparisons to the majority population were available, no significant differences emerged, suggesting that a history of suicide attempts is equally prevalent across all groups. However, this finding may also reflect disparities in hospital admissions following self-harm records (Polling et al., 2021) or underreporting in health records.

We found that people who died by suicide from some ethnic minority groups were less likely to experience mental health problems compared to those from majority populations. This finding could represent a genuinely lower burden of psychopathology or alternatively may indicate underdiagnosis in ethnic minority groups. Our finding that mental health service contact/treatment receipt was generally lower among ethnic minority groups (Table 4) is in-keeping with previous research linking minority ethnicity to lower mental healthcare engagement (Tang et al., 2021) and could be evidence of either hypothesis; it is not possible to tell from our findings whether people from ethnic minority backgrounds do not use services because they have less need for them, or, if they are less likely to receive a diagnosis because they face barriers to accessing services. However, previous research (not specifically related to suicide) has identified important barriers to mental healthcare such as

Table 5
Gaps in the literature highlighted by this review.

		Number of studies reporting each characteristic								
	Minority group	**Indigenous groups**			**Migrant groups**			**Other ethnic minority groups**		
	Study quality rating	Low	Moderate or High	**Total**	Low	Moderate or High	**Total**	Low	Moderate or High	**Total**
Characteristics of individuals who died by suicide	General mental health problems	4	3	**7**	1	2	**3**	4	1	**5**
	Depression	6	2	**8**	2	1	**3**	5	0	**5**
	Alcohol and/or substance use	7	2	**9**	3	2	**5**	5	1	**6**
	Treatment and/or service contact	6	2	**8**	2	1	**3**	4	2	**6**
	Previous suicide attempt/s	6	1	**8**	1	1	**2**	2	1	**3**
	Death by suicide in a loved one	5	0	**5**	1	0	**1**	2	0	**2**
	Relationship problems	6	0	**6**	0	0	**0**	3	1	**4**
	Financial status and deprivation	5	0	**5**	2	3	**5**	4	1	**5**
	Unemployment and other work-related problems	5	1	**6**	2	2	**4**	1	2	**3**
	Criminal/legal problems	6	0	**6**	1	0	**1**	3	1	**4**

Key: red = no studies, orange = 1–3 studies, green = 4 or more studies.

stigma (Eylem et al., 2020), intersecting factors like racism, migration stress, trauma, and spirituality (Bansal et al., 2022) and experiences of discrimination in wider society that play out in healthcare settings (Smye et al., 2023). When it comes to understanding how these factors might influence suicide risk, further research is required to understand the direction of these findings and provide more evidence for specific ethnic minority groups (Table 5).

We found evidence that Indigenous people and migrants who died by suicide generally had lower engagement with mental health services than majority groups, though findings varied by region and care measure reported. The findings that Indigenous people in Australia were less likely to have received mental illness treatment (De Leo et al., 2012) whereas Native Americans in the US were as likely as White individuals to have had a mental health evaluation (Vannoy et al., 2016), although the studies took place in very different settings, might indicate that there is parity in terms of evaluations but that Indigenous individuals are less likely to go on to receive treatment. Perhaps negative experiences of services put people off accessing treatment; a previous study from Canada found that Indigenous individuals may experience a re-creation of trauma when accessing services (Smye et al., 2023).

The mixed findings on mental healthcare use among migrants may reflect financial charges (BMA, 2025) or other barriers such as different understandings of mental illness and treatment, lack of awareness of services, or language barriers (Dumke et al., 2024). A UK study found that only 62.5 % of migrants who died by suicide were registered with a GP or known to mental health services (Ougrin et al., 2010), despite universal access to free primary healthcare. This suggests that using GP care-mortality data linkages to examine suicide may systematically exclude migrants, who are less likely to engage with GP services.

Our findings also highlight potential discrepancies in employment rate and financial status/deprivation, particularly among migrants, compared to those from the majority population. In some countries, employment rates for migrants may be reflective of laws and regulations preventing certain migrant groups from working, for example, asylum seekers and those with irregular immigration status. Even for those who have the right to work, other barriers to employment exist, such as language proficiency, education and family structures (Al-Hamad et al., 2024). For example, in Sweden, where refugees do have the right to work, the employment rate remains lower among refugees compared to both the Swedish-born population and non-refugee migrants (Statistics Sweden, 2023). The finding from the South African study (Stark et al., 2010) that Black individuals who died by suicide were more likely to be unemployed compared to White individuals, despite being the majority ethnicity in the country, is reflective of racial discrepancies in unemployment rates present in wider society at the time (Lehohla, 2009) and may speak to structural barriers that relate to other factors beyond minority ethnic status.

The finding from the UK of an association between ethnic minority suicide and lower levels of socioeconomic disadvantage (Alothman et al., 2022) is notable. Potential mediating factors might include communal living and wider sense of community, which may mitigate the impact of low socio-economic status on ethnic minority group.

4.1. Limitations of included papers

A significant finding of this review was an over-representation of studies from North America, Europe and Oceania. There was a lack of moderate-high quality studies (Table 5) and an absence of good quality data on migration or ethnicity in included studies. Specifically, studies over-relied on death certificates to identify ethnicity, and some did not clearly state how migration status or ethnicity were measured. There was heterogeneity in the way studies grouped ethnicity. For example, several studies from the US used an “other ethnic group” category, which likely combined distinct ethnic groups. There was also considerable heterogeneity in the way in which characteristics were reported, in terms of definitions, measurements and timeframes. This is especially important for characteristics such as mental disorder diagnoses or employment which can vary over time and may or may not be relevant at one's time of death. Many studies reported the presence of any or general mental health problems, and fewer reported specific diagnoses, which hindered our ability to examine specific diagnoses in any detail. Furthermore, even diagnostic criteria (considered to be the gold-standard) may not be sufficiently culturally adapted to accurately diagnose mental health problems among people from all cultural backgrounds. This has the potential to lead to either under- or over-diagnosis of some mental disorders, depending on how presenting symptoms and idioms of distress are interpreted by assessors.

4.2. Strengths and limitations of this review

To our knowledge, this is the first review to examine the prevalence of clinical and modifiable sociodemographic characteristics among people who died by suicide from ethnic minority backgrounds. Searches were extensive, we aimed to include data from across the globe and did not exclude non-English papers. The inclusion of only moderate-high quality studies when drawing conclusions minimised the impact of bias. In addition, we decided to group data by specific categories of ethnicity and migrant status, as opposed to minority vs majority groups. This was based on the results of the initial review which grouped minorities into one category and found high levels of heterogeneity (Troya et al., 2022). By further sub-dividing the exposure variable into Indigenous, migrant, and other ethnic minority groups, we aimed to reduce

some of this heterogeneity and identify results that could be used to inform the development of nuanced suicide prevention strategies. However, it is important to acknowledge that the broad categories used in this review (Indigenous, migrant, and other ethnic minority groups) still have considerable within-group heterogeneity. In particular, the migrant population includes individuals with diverse legal statuses, welfare entitlements, and access to social protection, such as refugees, asylum seekers, undocumented migrants, and labour migrants.

There are, however, some important limitations. Due to the large number of studies identified, it was not possible to implement a process of double screening for the updated search (2020−2023). However, a sample of studies were double-screened and there was good agreement between reviewers. Secondly, the search strategy was limited to manuscripts with English language titles or abstracts, which may have led to under-representation from non-English speaking countries. Thirdly, we limited the inclusion criteria to peer-reviewed articles due to the large number of studies identified, which increases the risk of publication bias.

4.3. Implications

The findings of this review have several important implications for clinicians, researchers and policy makers. While descriptive statistics cannot unpick causal relationships or mechanisms, reporting the characteristics of people who die by suicide from different ethnic and migrant groups can be of considerable utility by informing the focus of future prevention efforts and research.

For clinicians, this review highlights the importance of holistic bio-psycho-social clinical assessments that do not universally focus on historical risk and mental illness. Barriers to mental health services for people from ethnic minority backgrounds should be minimised. Beyond this, assertive activities may be required to optimise attendance and engagement. It is also important that when people do access care, they are provided with culturally adapted services that meet their needs.

For researchers, the results highlight the need for more research into the characteristics of suicide deaths from ethnic minority backgrounds and migrants. They also highlight the on-going issue of high risk of bias in the measurement of ethnicity in research studies and encourage researchers to utilise national databases, census data or self−/family-report to ascertain demographic characteristics. It also calls for researchers to clearly describe the way in which ethnicity and migration have been measured in scientific papers. The large numbers of studies excluded at full-text screening stage due to there being no extractable data (Fig. 1) highlights the need for researchers to present data on the characteristics of people who die by suicide stratified by ethnicity and migration status. As most of the available evidence originated from high-income countries, future research should include data from low- and middle-income settings to improve the global applicability and relevance of findings.

For policymakers, this review adds to the argument for investment in up-stream public health interventions to address suicide (Hawton and Pirkis, 2024), such as removing barriers to employment and income support. Interventions designed to remove barriers to employment and increase occupational opportunities for migrants may help to reduce suicide risk in migrant communities. People from ethnic minority backgrounds who are incarcerated in prison may be especially vulnerable and interventions should be developed that support this specific population. Those interventions that are designed with input and buy-in from the local communities they serve, are most likely to tackle the important factors that increase suicide risk in each specific context.

CRediT authorship contribution statement

Grace Crowley: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis. **Sam Gnanapragasam:** Writing – review & editing, Investigation. **Jack B. Fanshawe:** Writing – review & editing, Investigation. **Henry Allberry:** Writing – review & editing, Investigation. **Lana Bojanić:** Writing – review & editing, Investigation. **Su-Gwan Tham:** Writing – review & editing, Investigation. **Stephanie R. Hannam-Swain:** Writing – review & editing, Investigation. **Faraz Mughal:** Writing – review & editing, Investigation. **Rosina Pendrous:** Writing – review & editing, Investigation. **Kirsten Russell:** Writing – review & editing, Investigation. **Navneet Kapur:** Writing – review & editing, Conceptualization. **M. Isabela Troya:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization. **Duleeka Knipe:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization.

Funding

No specific funding was required for this study. GC is supported by a Wellcome Trust doctoral fellowship (324090/Z/25/Z). SG is supported by the Wellcome Trust. JBF is supported by an NIHR Academic Clinical Fellowship (ACF-2023-13-016). FM, Doctoral Fellow, NIHR 300957, was funded by the National Institute for Health and Care Research (NIHR) for this study. FM is supported by the NIHR Greater Manchester Patient Safety Research Collaboration (NIHR204295). RP is funded through a UKRI grant (MRF-170-1209-RG-LAVI). NK reports grants from the Healthcare Quality Improvement Partnership, NHS England, the Department for Education, and the Medical Research Council. MIT is funded by the Health Research Board of Ireland (ARPP-2023-006). DK is supported by the Wellcome Trust through an Institutional Strategic Support Fund Award to the University of Bristol (204813/Z/16/Z) and the Elizabeth Blackwell Institute for Health Research University of Bristol. The views expressed in this article are those of the authors and not necessarily those of their funders.

Declaration of competing interest

GC is a member of the Royal College of Psychiatrists Working Group for Mental Health and Forced Migration. FM was a member of the 2022 NICE self-harm guideline development committee. NK works with NHS England on national quality-improvement initiatives for suicide and self-harm; is on the Department of Health and Social Care (DHSC) National Suicide Prevention Strategy Advisory Group for England; chaired the guideline development group for the 2012 UK National Institute for Health and Clinical Excellence (NICE) guidelines on the longer-term management of self-harm; chaired the guideline development group for the 2022 NICE guideline on depression in adults; and was a topic advisor for the 2022 NICE guideline *Self-Harm: Assessment, Management and Preventing Recurrence*. DK is a member of the steering committee for the National Suicide Prevention Alliance, UK SG, JBF, HA, LB, ST, SRHS, RP, KR and MIT have no conflicts of interest to declare.

Acknowledgements

The authors would like to acknowledge Hayley Gorton for her support with the title/abstract screening for this review. They would also like to acknowledge the following individuals for their work on a previous systematic review, the search of which formed the initial search of this current review: Matthew J Spittal, Sadhbh Byrne, Hayley Gorton and Rebecca Musgrove. The authors would also like to thank Pik Hampton for her administrative support.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2025.121021.

Data availability

Our study is based on published data and data provided by the authors of original papers on request. The data supporting the findings of this study are available within this article and the supporting files. All data retrieved from original papers, together with tables and figures arising from these data, are available to share upon reasonable request to the corresponding author.

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