

## Review Article

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# International trends in male youth suicide and suicidal behaviour

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## Abstract

**Objective:** Suicide and suicidal behaviour strongly contribute to overall male youth mortality. An understanding of worldwide data contextualises suicide and suicidal behaviour in young men within any given country. **Method:** Members and colleagues of the World Federation of Societies of Biological Psychiatry's Task Force on Men's Mental Health review the relevant data from several regions of the world. The review identifies notable findings across regions of relevance to researchers, policymakers, and clinicians. **Results:** Male suicide and suicidal behaviour in adolescence and emerging adulthood within North America, Latin America and the Caribbean, Europe, the Mediterranean and the Middle East, Continental Africa, South Asia, East Asia, China, and Oceania share similarities as well as significant points of divergence. **Conclusions:** International data provide an opportunity to obtain a superior understanding of suicide and suicidal behaviour amongst young men.

## Summations

- Males in adolescence and emerging adulthood die by suicide at higher rates relative to age-matched females in most regions of the world.
- Despite higher rates of death by suicide, male youth frequently have lower rates of suicidal ideations and suicide attempts relative to their female peers.
- As suicidal ideation and suicide attempts are warning signs for suicide, this presents a clinical challenge for suicide prevention.

## Considerations

- Despite many unique cultural facets amongst global regions, increasing globalisation and universal developmental elements generate shared clinical factors which influence suicidality.
- Substance use and substance use disorders are major risk factors for male youth suicidality. Evaluating substance use and substance use disorders is a key element of suicide risk assessment in young men.
- Traditional Masculine Ideologies (TMI) is another cross-cultural risk factor for suicidality. Young men with high TMI are less likely to seek help and die by suicide at double the rate of those with low TMI, which points to the importance of incorporating an evaluation for TMI in risk assessment.

## Introduction

Clinicians, researchers, and public health policy professionals working in the field of youth suicide and suicidal behaviour have produced empirical knowledge, clinical interventions, and healthcare policies for reducing youth suicide. In an increasingly integrated world, these efforts

advance through contextualisation within international trends. While individual studies frequently focus on specific countries or regions or provide a broad global overview, a side-by-side review of national, regional, and international data provides an important perspective.

In this review, members and colleagues of the World Federation of Societies of Biological Psychiatry (WFSBP) Task Force on Men's Mental Health (WFSBP, 2022) present adolescent and emerging adulthood suicide and suicidal behaviour data from several regions of the world, including North America, Latin America and the Caribbean (LAC), Western, Eastern, and Northern Europe, the Mediterranean and the Middle East, Continental Africa, South Asia, East Asia, China, and Oceania. Male youth crude suicide rates alongside female and total crude suicide rates by country (Figure 1, Table 1) and by region (Figure 2, Table 2) among adolescents aged 14–19 according to 2019 World Health Organization (WHO) Data provide an overview for this review (World Health Organization, 2024). Other rates discussed in this review will vary based on age range, deriving study methodology, type (e.g., age-adjusted vs. crude), and year(s) sampled. Our integration of a wide range of data will underline the importance of topics including firearm control, poverty, religion, globalisation, substance use disorders, and TMI as universal factors to consider in best management of male youth suicidal behaviour and suicide.

This manuscript builds upon prior comparable reviews amongst many countries (e.g., Weissman *et al.*, 1999) focused on male adolescents and their generally higher rates of suicide and lower prevalence of suicidal ideation and behaviours. As suicidal thoughts and behaviours are visible warning signs that can inform clinical intervention prior to death by suicide, and as young men relative to women generally show less of these prior to suicide internationally, there is a unique challenge to prevent early male suicide. This international review contributes to the address this challenge by increasing clinician and researcher awareness of early male suicide within its global context. This is the first comprehensive international review of this subject within its global context.

### North America

Male youth suicidality in the United States and Canada differs in that while US rates increased in recent years (Miron *et al.*, 2019a), Canadian rates decreased over a similar timeframe (Skinner & McFaul, 2012a). Whereas these two countries are large and diverse and require attention to regional differences and qualities within the available data, we will highlight the importance of firearm availability as a key explanatory factor for this core finding in our survey of this region.

### United States

Over the past decade, deaths from suicide among US adolescents increased by 45.2% (Joseph *et al.*, 2022). From 1999 to 2020, male adolescent suicide rates among youth aged 10 to 19 increased from 7.4 to 9.7 per 100,000 population (Joseph *et al.*, 2022). While women in middle adolescence through emerging adulthood (aged 15–24) have suicidal ideation and attempt suicide at higher rates (Ivey-Stephenson *et al.*, 2020), males in this age group more commonly die by suicide (Curtin *et al.*, 2021). Culturally, young women are more willing to seek help during times of crisis, which may contribute to why fewer die by suicide (Labuhn *et al.*, 2021). Males also traditionally choose more lethal means, though this gap may be closing (Ormiston *et al.*, 2024). In 2017, 6,241 youth aged

**Table 1.** Crude suicide rates among 15–19-year old in 2019 by country

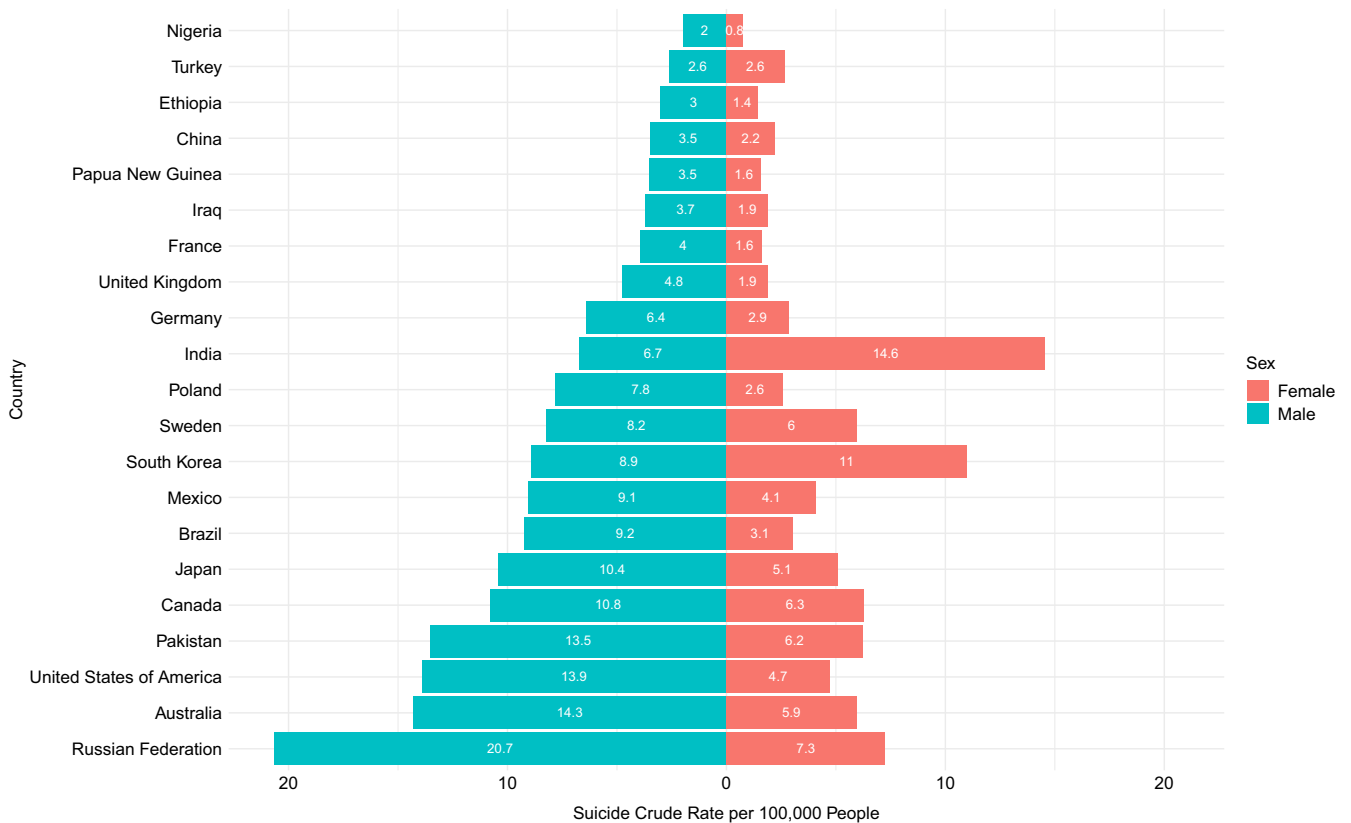
| Country            | Male  | Female | Both sexes |
|--------------------|-------|--------|------------|
| Russian Federation | 20.67 | 7.26   | 14.11      |
| Australia          | 14.31 | 5.94   | 10.22      |
| United States      | 13.92 | 4.73   | 9.42       |
| Pakistan           | 13.54 | 6.22   | 10.03      |
| Canada             | 10.8  | 6.28   | 8.6        |
| Japan              | 10.44 | 5.09   | 7.84       |
| Brazil             | 9.25  | 3.06   | 6.21       |
| Mexico             | 9.06  | 4.1    | 6.61       |
| South Korea        | 8.93  | 10.97  | 9.91       |
| Sweden             | 8.22  | 5.95   | 7.11       |
| Poland             | 7.83  | 2.6    | 5.26       |
| India              | 6.71  | 14.55  | 10.4       |
| Germany            | 6.41  | 2.85   | 4.7        |
| United Kingdom     | 4.78  | 1.91   | 3.38       |
| France             | 3.95  | 1.63   | 2.81       |
| Iraq               | 3.72  | 1.9    | 2.83       |
| Papua New Guinea   | 3.53  | 1.59   | 2.59       |
| China              | 3.5   | 2.22   | 2.9        |
| Ethiopia           | 3.02  | 1.44   | 2.24       |
| Hungary            | 2.94  | 2.22   | 2.59       |
| Turkey             | 2.62  | 2.65   | 2.63       |
| Nigeria            | 2     | 0.76   | 1.39       |

Source: World Health Organization.

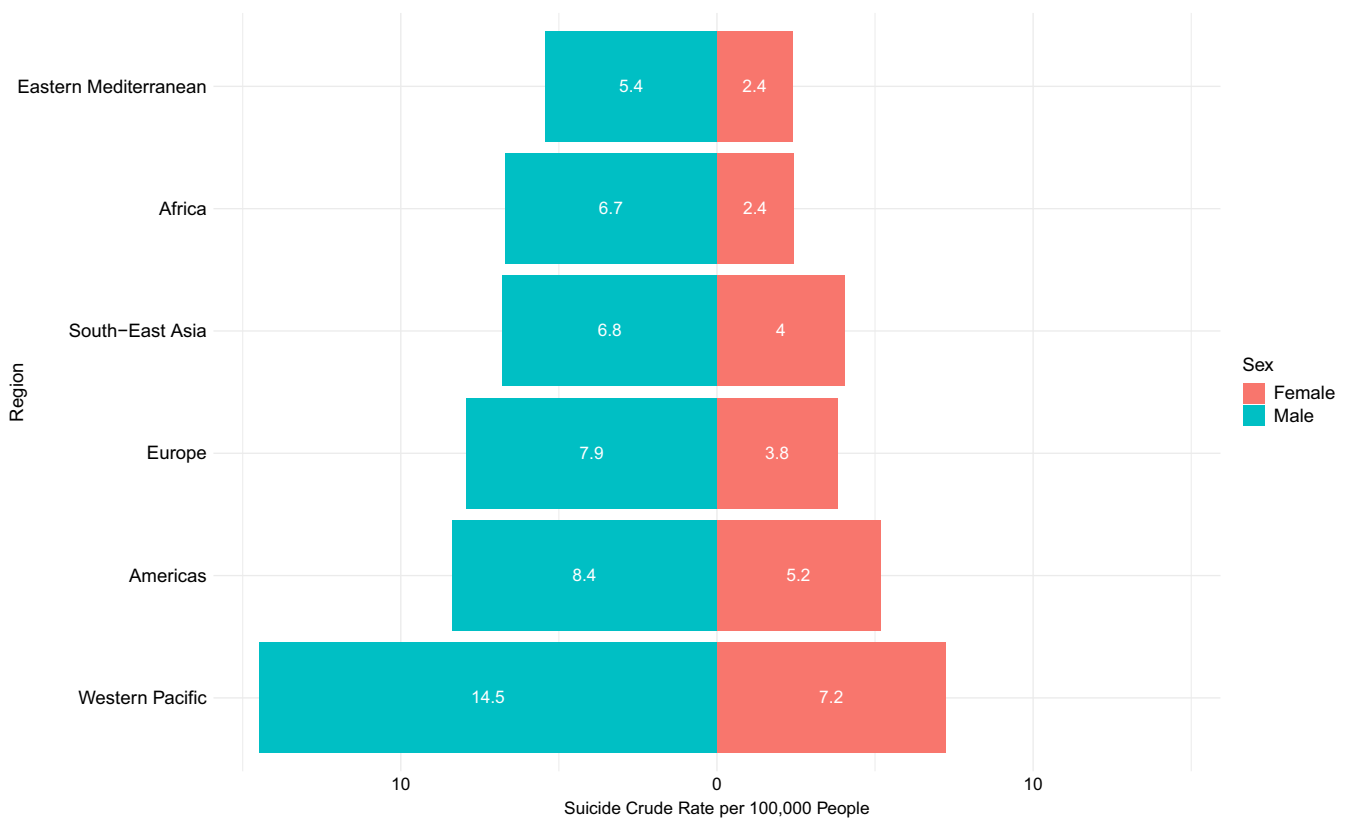
15 to 24 died by suicide, of which 5,016 (80%) were male (Mittendorfer Rutz & Wasserman, 2004). This is the culmination of an increasing trend of male adolescent suicide from 2014 to 2017, where a 14.2 annual percent change during this time period occurred (Mittendorfer Rutz & Wasserman, 2004).

In 2019, 13.3% of male high school students seriously considered attempting suicide, 11.3% of male students had a suicidal plan, and 6.6% of male high school students had attempted suicide (Ivey-Stephenson *et al.*, 2020). Moreover, 1.7% of male high school students made a suicide attempt requiring medical attention (Ivey-Stephenson *et al.*, 2020).

Firearms remained the number one cause of suicide amongst US male youth aged 10–19 who died by suicide between 1999 and 2020, irrespective of race (Joseph *et al.*, 2022). Despite this racially universal finding, there are racially significant differences in the use of firearms: between 2011 and 2020, suicide by firearm use increased from 49.0% to 52.0% among white male adolescents and from 40.0% to 51.0% among black male adolescents (Joseph *et al.*, 2022). In 2009, 40% of individuals in the US reported having a gun in their home (Rodríguez Andrés & Hempstead, 2011). According to a cross-sectional study that looked at suicide case fatality rates in the United States, firearms were the most fatal method of suicide, and suicide attempts by males were 8 times more likely to involve firearms than suicide attempts by females (Conner *et al.*, 2019). Studies have suggested that there is a negative correlation between firearm restrictions and suicide, and in particular, a ban on



**Figure 1.** Crude suicide rates among 15–19-year olds in 2019 by country. *Source:* WHO.



**Figure 2.** Crude suicide rates among 15–19-year old in 2019 by region. *Source:* WHO.

**Table 2.** Suicide rates among 15–19-year olds in 2019 by region

| Region                | Male  | Female | Both sexes |
|-----------------------|-------|--------|------------|
| Western Pacific       | 14.48 | 7.24   | 10.95      |
| Americas              | 8.38  | 5.16   | 6.8        |
| Europe                | 7.93  | 3.8    | 5.92       |
| South-East Asia       | 6.78  | 4.04   | 5.43       |
| Africa                | 6.7   | 2.41   | 4.57       |
| Eastern Mediterranean | 5.42  | 2.38   | 3.95       |

Source: World Health Organization.

purchases of firearms by minors impacts youth male suicide (Rodríguez Andrés & Hempstead, 2011).

### Canada

In contrast, between 1980 and 2008, suicide rates among adolescents aged 15–19 decreased from 19.0 per 100,000 in 1980–12.1 per 100,000 in 2008 (Statistics Canada, 2023). This represents an annual average annual decrease of 2.0% (Statistics Canada, 2023). More recently, in 2019, 11.9 per 100,000 males aged 15–19 died by suicide in Canada, compared to 6.9 per 100,000 females who died by suicide in the same age range (Statistics Canada, 2023).

From 1980 to 2008, suicides via firearm use decreased by an average of 6.7% per year in this developmental age (Statistics Canada, 2023). Several pieces of legislation on firearm restrictions, which decrease the accessibility of firearms, have been passed in Canada since the 1970s. A review of 13 studies that explored the association between Canadian legislation, firearm regulation, and suicide found that there was a relationship between legislation and a decrease in suicide rate by firearms (Langmann, 2021). Gun ownership in Canada is less prevalent than in the US: One study concluded that if the United States had the same rate of firearm ownership as Canada, then the suicide fatality rate in the United States would be 26% lower, resulting in a 29% decrease in suicide fatalities among men (Raifman *et al.*, 2020).

In addition, Canada's universal and publicly funded healthcare system may make it more likely for male youth to readily access healthcare services, including behavioural health support, during times of crisis. In a study conducted with Canadian adolescents, it was observed that both adolescent boys and girls who had personal experiences with depression or suicide held stigmatising beliefs about themselves. However, a larger proportion of adolescent boys, in comparison to girls, expressed that they would feel embarrassed about seeking professional help for depression (Oliffe *et al.*, 2016). Specific policy measures to reduce barriers to men in adolescence and emerging adulthood may complement the benefit of general healthcare accessibility.

Although there has been a decrease in suicidality amongst male adolescents, suicide remains the second leading cause of death in adolescents and young adults aged 15–34 years in Canada (Zulyniak *et al.*, 2022). While the suicide rate amongst adolescent men aged 15–19 years was 12.1 per 100,000 in 2008, the suicide rate amongst adolescent women was 6.2 per 100,000 in the same year (Statistics Canada, 2023). In another important Canadian study

involving adolescents in grades 10–12 from various schools, it was found that their perception of support and involvement with their school was linked to a reduction in suicidal ideation for both men and women (Langille *et al.*, 2015). Efforts to help male youth feel connected with their schools' social community may reduce suicide rates.

## Latin America and the Caribbean

### Overview

The transition from the United States and Canada to LAC entails a transition from a region of low to high poverty. In a systematic review of low- and middle-income countries globally, poverty associated with suicidal ideation and behaviour (Iemmi *et al.*, 2016). Approximately 77% of global suicides occurred in low- and middle-income countries in 2019 (World Health Organization, 2021b).

Historically in LAC countries, the data quality has been constrained by cultural attitudes and stigma, resulting in misclassification, underreporting, and inadequate surveillance (Pan American Health Organization, 2014). A marked disparity in reporting exists among countries that share similar levels of development (Pan American Health Organization, 2014).

For adolescents aged 15–19, suicide is the third cause of death in this region, and roughly more than 10 adolescents die from suicide in this part of the world every day (UNICEF, 2021). Suicide was also the third leading cause of death in people between 20–24 years old (Pan American Health Organization, 2021), with the most common associated factors being depression, anxiety, family dysfunction, and previous suicide attempt (Cárdenas, 2021).

As with the North American region, Latin America follows the world trend in gender dynamics for suicide. Between 2005 and 2009, the WHO reported that the standardised mortality rate from suicide for the overall male population in LAC was 8.39 deaths per 100,000 men, whereas for female population it was 2.12 per 100,000 (Cárdenas, 2021), or approximately four male suicides for every female suicide. One notable exception is Argentina, where 2013 study (Bella, 2013) found suicide rates for girls aged 10–19 to be slightly higher compared to age-matched adolescent boys. As with North America, female adolescents in the region are more likely to attempt suicide, while male adolescents are more likely to complete suicide (UNICEF, 2021).

### Country-specific data

Several countries in the region have notable data that merit their selective consideration. Across the region, Guyana, Suriname, Nicaragua, El Salvador, Chile, and Ecuador have the highest male suicide rates (Quinlan-Davidson *et al.*, 2014a). In Colombia, which exhibited a relatively stable trajectory in suicide rates, more than half of the reported suicide cases in 2021 occurred in the population under 30 years of age, and one of every 13 deaths in minors is associated with suicide (National Administrative Department of Statistics of Colombia, 2022). There, the suicide rate of male adolescents aged 15–19 is 7.2/100,000 compared to 3.8/100,000 in females within the same age group (Ministerio de Protección Social, 2017; World Health Organization, 2021a). In Argentina, a study revealed that suicide rates in the population older than 25 years remained stable, while adolescent suicide

showed an upward trend during the period from 2005 to 2007 (Bella, 2013).

Brazil is one of the LAC countries with a high number of total fatalities by suicide, though due to its large population, the overall suicide rates in the country are relatively low. Between 2012 and 2015, the 15–24-year-old age group had a suicide rate of 6.8/100,000, and men were 3 times more likely to commit suicide (Böttcher & Garay, 2021a). Uruguay is another country with one of the highest suicide rates in the subcontinent: One governmental brief recounted 79 deaths by suicide in early adolescence through emerging adulthood (10–24 years of age) in 2009 (Salón de Actos del Ministerio de Salud Pública Montevideo, 2013), with suicide being the leading cause of death in this range by 2020 (17.6/100,000 in the 2019 WHO report) (Ministerio de Sa lud Publica de Uruguay, 2021; World Health Organization, 2021a).

From 2000 to 2008, the suicide mortality rate for males in Mexico between the ages of 15 and 24 years was 9.6 per 100,000 people (Quinlan-Davidson *et al.*, 2014a). This is more than triple the rate of Mexican females of the same age during this time period, which was 2.7 per 100,000 people (Quinlan-Davidson *et al.*, 2014a). Between 1998 and 2012, the rate of completed suicide for Mexican boys aged 12–15 nearly doubled (Leenen & Cervantes-Trejo, 2014). According to The Mexican Adolescent Mental Health Survey, of approximately 3,000 adolescents aged 12–17, 7.6% reported suicidal ideation (Borges *et al.*, 2008). In another survey of nearly 18,000 adolescents ages 10–19, males with suicide attempts represented 1.8% of the sample, which is an increase from data obtained over a 12-year period (Valdez-Santiago *et al.*, 2021). One study across Mexico found the rate of suicide for men compared to women to be 4.6:1 (Fernández-Niño *et al.*, 2016). Proposed reasons for the increased numbers of completed suicide amongst men compared to women include masculine gender roles prompting more self-destructive behaviours, substance use, not seeking out mental healthcare, and greater access among men to means of suicide (Fernández-Niño *et al.*, 2016).

This increase in suicidality exists as many people throughout Mexico are living in poverty. In 2018, 41.9% of the Mexican population was living in poverty, and in 2020, that number increased to 43.9% of the population, or 55.7 million people (Shuying & Xuedong, 2022). In 2018, 20.1 million people in Mexico did not have access to healthcare services (16.2% of the population) and in 2020, 35.7 million people lacked this resource (28.2% of the population) (Shuying & Xuedong, 2022). Not having access to healthcare services or treatment may exacerbate depressive or suicidal feelings held by adolescents.

Limited numbers of psychiatrists can also limit access to mental healthcare. In 2018, there were 3.71 psychiatrists per 100,000 people and 0.96 child and adolescent psychiatrists per 100,000 kids under the age of 16 in Mexico (Heinze *et al.*, 2019). The majority of psychiatrists and child and adolescent psychiatrists in Mexico live in the three largest cities in the country, which significantly limits access to mental healthcare for those living outside of the major cities (Heinze *et al.*, 2019).

Additionally, Catholicism has been embedded into many aspects of Mexican culture (Hoffman & Marsiglia, 2014a). Given that the Catholic Church has a strong stance against suicide, it is possible that this view permeates throughout Mexican society and thus may contribute to the overall low rate of suicide in Mexico and countries in Latin America when compared to other countries in the region (Hoffman & Marsiglia, 2014a). Within the Americas, the non-Hispanic Caribbean and North America have had the highest rates of suicide (Yunes & Rajs, 1994).

## Europe

Europe is a culturally diverse region with a rich history. While male adolescent suicide mortality increased across the region in the 1980s and 1990s (Mittendorfer Rutz & Wasserman, 2004; Mittendorfer-Rutz, 2006), male adolescent suicide rates have decreased in the most recent two decades (Eurostat, 2023). However, suicide remains ranked as the second most frequent cause of death in the 10–19-year-old age group (Bilsen, 2018).

There is significant variation in suicide rates within Europe. Among all the European countries, the Baltic states, which include Lithuania, Latvia, and Estonia, exhibited the highest rates of adolescent suicide among 15–19-year-old in 2019 (12.7, 11.21, and 12.89 per 100,000, respectively), with only Luxembourg (12.02 per 100,000) the geographic exception within this group (Eurostat, 2023). Interestingly, some other Northern European countries also reported notably high adolescent suicide rates in this age group when compared to the EU average of 4.3 per 100,000 (Eurostat, 2023). For instance, Finland had a rate of 11.47 per 100,000, Sweden at 8.15 per 100,000, Iceland at 9.05 per 100,000, and Norway at 9.39 per 100,000 (Eurostat, 2023), whereas Denmark, traditionally considered a Nordic country but geographically located on the continent, had a rate of 4.36 per 100,000 that very closely approximated the EU average (Eurostat, 2023).

To better examine this broad region, we focus our review on Western, Eastern, and Northern European regions separately.

## Western Europe

Despite world-leading healthcare systems, and good access to healthcare in Western Europe, suicide is the leading cause of death among 10–25-year-olds (Peter *et al.*, 2020; Glenn *et al.*, 2020a). As seen in the Americas, more males than females die by suicide: The adolescent male suicide rate is three times higher than for females in the region, and this gender difference persists – and even increases – into old age (Turecki *et al.*, 2019; Peter *et al.*, 2020; Glenn *et al.*, 2020a).

In Western European countries, for example, in Germany, Switzerland, and Austria, men in adolescence and emerging adulthood are between 2 and 4 times more likely to die by suicide compared age-matched women (Peter *et al.*, 2020; World Health Organization, 2021). This gender difference is particularly prominent in Austria, where the male adolescent (15–19 years old) crude suicide rate in 2019 was 10.2 per 100,000, while the female crude suicide rate was 2.4 per 100,000. Female adolescents are much more likely to report suicidal ideation and attempt suicide (Freeman *et al.*, 2017; Miranda-Mendizabal *et al.*, 2019; Schrijvers *et al.*, 2012). A recent national study in the United Kingdom shows how this pattern begins by age 13 years and accelerates into emerging adulthood (Rodway *et al.*, 2020).

## Highlighting three reports

In the following, we provide some key studies examining early male suicidality in youth in Western Europe. Several studies have been conducted to shed light on this issue, focusing on suicidal ideation, planning, and attempts among adolescents and young adults.

A study of adolescents and emerging adults aged 14–21 years of age by Voss *et al.* (2019), investigated the prevalence, onset, and course of suicidal behaviour in this age group in Germany. The authors found that 10.7% (female: 12.9%; male: 8.7%), 5.0% (female: 7.8%; male: 2.4%), and 3.4% (female: 4.5%; male: 2.3%) of the participants reported lifetime suicidal ideation, plan, and suicide attempt, respectively. Among these youth experiencing

suicidal thoughts, two-thirds (66%) reported ongoing or recurring ideation lasting over a year and three-quarters (75%) reported having had more than one suicidal episode. The study therefore highlighted an urgent public health need for timely identification of suicidal behaviour in adolescents and young adults to terminate persistent or recurrent suicidal tendencies and interrupt the ideation-to-action transition.

Another report by Miché *et al.*, aimed to predict suicide attempts in community adolescents and emerging adults aged 14–24 years of age using regression methods and machine learning (Miché *et al.*, 2020b). They found that the strongest predictors of suicide attempts were a history of suicide attempts, higher levels of depressive symptoms, and a history of self-injury. The analysis again emphasised the importance of early identification and intervention for these high-risk individuals, particularly in the Western European context, where male adolescents and young adults have higher suicide rates.

Miché *et al.* (2020a) further examined the relationship between specific traumatic events and the risk of a suicide attempt in a 10-year longitudinal community study on adolescents and emerging adults also aged 14–24 years of age. They found that exposure to interpersonal violence, particularly sexual assault and physical abuse, increased the risk of a suicide attempt. The study also highlighted that these risk factors were more prevalent among girls and young women, which may contribute to their higher rates of suicidal ideation and attempts compared to boys and young men in Western Europe.

These studies collectively emphasise the importance of understanding gender differences in suicidal behaviour among adolescents and emerging adults in Western Europe. Timely identification and intervention are crucial to addressing the public health concerns related to suicide in this population. By focusing on risk factors such as a history of suicide attempts, depressive symptoms, and exposure to interpersonal violence, prevention efforts can be better targeted to address the unique needs of both genders in the region. In turn, this can help to reduce the significant gender disparities observed in suicidal behaviour and ultimately contribute to a decrease in the overall adolescent and emerging adult suicide rate in Western Europe.

### Eastern Europe

The term 'Eastern Europe' holds a unique significance in the context of Europe's post-World War II political division. Beyond its geographic connotation, it represents a distinct region of European nations that underwent profound economic and political transformations as they emerged communist modes of organisation. These countries carry the remnants of more than 50 years of isolation from the Western community, which have profoundly impacted on various aspects of their societies. Importantly, this isolation has also left an indelible mark on the emotional health and well-being of the population. The legacy of political and economic isolation, coupled with the complex historical experiences of these nations, continues to shape the behavioural health landscape in Eastern Europe, making it a subject of considerable importance and scholarly exploration.

In the early 1990s, as the communist systems collapsed, several Eastern European countries underwent varying degrees of transition. During this period, there was a notable decrease in male life expectancy in some regions, attributable, in part, to the rising male suicide mortality rates observed in Baltic countries and

Russia (Notzon, 1998; Värnik *et al.*, 1998). These trends highlight the impact of the political changes on public health, especially in terms of male life expectancy and suicide rates in these areas.

While 11 out of the top 15 countries (73%) with the highest overall suicide rates in Europe are from Eastern Europe, a different pattern emerges when focusing on the youngest population aged 10–19 years: In this age group, only 6 of these top countries (40%) are from Eastern Europe (Roh *et al.*, 2018). Moreover, in contrast to the male-to-female ratio of 3–4 to 1 observed in the overall national suicide rates in Eastern European countries, this ratio in the subpopulation of 10–19 years old is notably lower, at 2–2.5 to 1 (Glenn *et al.*, 2020).

Several factors could contribute to this positive finding concerning adolescents in Eastern Europe. It is possible that the educational system, with its built-in gatekeepers and methods of surveillance, as well as potentially the lesser influence of Western culture, have played a role in these lower suicide rates among adolescents. Improved identification of at-risk youth and intervention prior to suicide may be another factor: for example, when investigating over 45,000 European students aged 15–16 years from seventeen European countries, it was found that the rate of self-reported suicide attempts was highest in Hungary (23.5%), and the same figure for self-reported self-harm thoughts was highest in Latvia (43.8%), both of which fall within Eastern Europe (Kaess & Brunner, 2012). Lastly, in the case of countries like Serbia, which report surprisingly low adolescent suicide rates, questions about the accuracy and completeness of the data may arise (Roh *et al.*, 2018; 55; Eurostat, 2023).

### Northern Europe

The Nordic countries that make up Northern Europe have ranked in the top ten globally to have achieved a high happiness index score (Andreasson, 2018). These countries utilise welfare state models, allowing researchers to access population-based registries and identification numbers that allow for comparing and combining data across different countries into one study (Laugesen *et al.*, 2021). While the data, evaluated with metrics related to social determinants of health, reflects positive reviews of these countries, the data does highlight a notable pattern regarding suicide and suicidal behaviours in adolescence and emerging adulthood: The Nordic countries and including Norway, Sweden, and Finland all demonstrate a general decline in adolescent suicide over several decades (Oskarsson *et al.*, 2023).

### Norway

Suicide rates in 10–14-year-old Norwegians saw a decline from 2.6 to 0.7 per 100,000 people over an 18-year timespan, and similarly, the rate amongst 15–19-year-olds decreased from 12.0 to 8.7 per 100,000 (Dervic *et al.*, 2008). The top two suicide methods employed by males between the ages of 15–24 years old are firearms and hanging, whereas the top two methods used by females are hanging and poisoning (Puzo *et al.*, 2016). In male suicides, death by hanging has increased with an annual percent change of 1.0% over a 44-year observation period, showing a particularly strong increase of 6.8% per year in 15–24-year-olds (Puzo *et al.*, 2016). There was a strong decrease in the male firearm suicide rate in the 15–24-year-old group after this type of suicide peaked in 1988, potentially due to the stricter firearm legislation and other preventative measures aimed at reducing suicide by firearms (Puzo *et al.*, 2016). Strangulation was the leading cause of death in 66% of suicides, firearms were used in 24% of cases, and

jumping from a high surface or drowning was prevalent in 5% of deaths (Freuchen *et al.*, 2012). Interestingly, the prevalence of Norwegian high school adolescent self-harm nearly quadrupled from 4.1% to 16.2% from 2002 to 2017–2018 and was notably increased in girls compared to their male counterparts (Tørmøen *et al.*, 2020).

### Sweden

In similar fashion to Norway, Sweden has seen a general decline in suicide rates over a 40-year timespan in children under 14 years of age, and a decline followed by a plateau in adolescents aged 15–24 years old (Hadlaczky, 2023). Between 1980 and 2022, men aged 15–24 years saw a decline over the years from 22.7 per 100,000 in 1980 down to 16.5 in 1982 followed by a spike up to 25.2 in 1989, and then a gradual decline with a plateau between 14 and 18 per 100,000 in the last 8 years (Hadlaczky, 2023). Female adolescents aged 15–24 years old were completing suicide at much lower rates at 7.75 per 100,000 with no specific trend in rates over the 40-year timespan, although there was a consistent decline from 10.3 in 2018 to 5.2 in 2022 (Hadlaczky, 2023). Also parallel to Norway, Swedish adolescents were utilising similar suicide methods where men's top choice of completed suicide was by hanging, followed by poisoning, then shooting between 2012–2022. Females were more likely to employ methods of poisoning, followed by hanging and then drowning (Hadlaczky, 2023).

### Finland

Finland's adolescent suicide rates are among one of the highest in Europe (Lahti, 2014). During the early 21st century in Finland, suicide was known to be the second-leading cause of death in male adolescents and the third leading cause of death in female adolescents aged 15–19 (Lahti, 2014). From 1969 to 2008, Finland witnessed 901 suicides among adolescents under 18 years of age. Among these individuals, 78% were male, and 22% were female, resulting in a male-to-female ratio of 3.6:1. An additional 63 cases were reported spanning from 2008 to 2012, and of these, 77% were male, and 23% were female, making the male-to-female ratio 2.5:1 (Lahti, 2014).

Risk factors follow similar patterns throughout Northern Europe, where the majority of adolescents experience school-related performance pressure (Bjorkenstam *et al.*, 2011), perfectionistic tendencies (Sand *et al.*, 2021), and bullying victimisation (De Looze *et al.*, 2020). Geographical and temperature-associated suicide rates have been explored in relation to suicide rates, and given Nordic countries' extremely high latitudinal position on the globe and the extreme variance in daylight throughout the seasons, such a factor has been considered in the research. However, it has not been found to be a significant contributor to suicide mortality (Hernæs & Skyrud, 2022).

### Denmark

Denmark has witnessed an overall downward trend in suicide rates. In 1995, the suicide rate stood at 21.35 per 100,000 individuals, declining to 12.49 per 100,000 people in 2019, marking a 41.5% decrease overall (Konieczna *et al.*, 2023). Notably, this decrease was proportionally higher among females, dropping from 13.55 to 6.27 per 100,000, compared to males, whose rates decreased from 29.48 to 18.85 per 100,000 (Konieczna *et al.*, 2023). As with other countries, male suicide rates increase through adolescence and emerging adulthood in Denmark inclusive of

Greenland (0.005% 15–19-year-old, 0.011% of 20–24-year-old, and 0.012 of 25–29-year-old (Bolliger & Gulis, 2018)).

From the 1980s until the present day, the downward trend in suicide rates has been stable and likely a result of several governmental interventions. Government-issued psychosocial therapy (Erlangsen *et al.*, 2015) and specialised suicide treatment units (Healthcare Denmark, 2021) became widely available for those who presented with suicidal ideations and self-harm. Age restrictions, as well as required prescriptions for larger packet sizes of over-the-counter analgesics, were implemented in attempts to mitigate suicide rates and showed success (Morthorst *et al.*, 2020). Strict gun control legislation in Denmark has also restricted access to firearms (Konieczna *et al.*, 2023).

### Summary

Eastern, and particularly North-Eastern, European countries have historically faced high suicide and overall mortality rates. Despite the remarkable and consistent decline in national suicide rates across almost all European countries, the rates of suicidal ideation and behaviour for adolescents and young men in most Eastern European countries remain among the highest. However, data also reveal that the suicide mortality of adolescents and young individuals in these Eastern European countries is comparatively favourable, and trends across Europe are promising, potentially related to increasing attention and intervention. For instance, the SEYLE (Saving and Empowering Young Lives in Europe) study, which targeted 14–15-year-old children in ten European countries (Austria, Estonia, France, Germany, Hungary, Ireland, Italy, Romania, Slovenia, and Spain) and was conducted between November 2009 and December 2010, yielded promising results (Wasserman *et al.*, 2015). It revealed that implementing professional screening and referral for at-risk patients reduced suicide attempts by more than 50 per cent when compared to a control group (Wasserman *et al.*, 2015). It is crucial to understand the reasons behind this trend to continue the substantial reduction in adolescent suicide rates in the region.

### The mediterranean and the middle east

Youth suicide and suicidal behaviour in the Mediterranean and the Middle East regions is increasing and has been identified as an important public health concerns with significant social consequences (Eskin, 2020; Amini *et al.*, 2021). Despite the growing recognition of this issue, there is still limited knowledge about the prevalence, risk factors, and protective factors associated with suicide and suicidal behaviour in these areas. This knowledge gap is particularly relevant in the Mediterranean region, where cultural, social, and economic differences among countries may influence the epidemiology of suicide and the effectiveness of prevention and intervention strategies (Eskin, 2020).

The five countries discussed in this section are Tunisia, Morocco, Turkey, Iran, and Lebanon. These countries have a unique intersection regarding culture, religion, and socio-economic factors that influence mental health and suicidal behaviour in male adolescents in the region. They share Middle Eastern and Mediterranean values and religious backgrounds. The religion of Islam plays a pivotal role in shaping people's views on mental health and cultural values. By exploring the cultural and societal norms, we gain an understanding of masculinity, mental health, and suicidal behaviour in the region. Despite the shared values and culture, each country's socio-economic status brings

diversity. For instance, Turkey and Iran have more developed health infrastructures compared to the others, which can affect the mental health support available to their at-risk populations. Political instability in some of these countries can exacerbate the risks faced by certain populations. These five countries were selected based on their shared values and the variety of socio-economic factors present in each.

### Tunisia

Tunisia has a high prevalence of suicidal ideation and suicide attempts among high school students (Guedria-Tekari *et al.*, 2019). OfKlicken oder tippen Sie hier, um Text einzugeben. the 821 high school students included in this study, 9.6% ( $n = 79$ ) had suicidal thoughts and 7.3% ( $n = 60$ ) had attempted suicide. As with other regions of the world, female gender (OR = 2.56, 95% CI = 1.32–4.95,  $p = 0.005$ ) was associated with suicidal ideation and behaviour: The prevalence of serious suicidal thoughts amongst adolescent girls was almost triple that among boys (12.14% of girls vs. 4.21% of boys,  $p = 0.001$ ). Other notable risk factors included a history of depression (OR = 2.29, 95% CI = 1.38–3.80,  $p = 0.001$ ), and self-injurious behaviour (OR = 3.16, 95% CI = 2.054.86,  $p < 0.001$ ), current depressive symptoms (OR = 5.50, 95% CI = 2.14–14.11,  $p < 0.001$ ) and low self-esteem (OR = 2.74, 95% CI = 1.71–4.38,  $p < 0.001$ ), were significant risk factors for suicidal behaviour among adolescents (Guedria-Tekari *et al.*, 2019). Interestingly, a recent study of North Tunisian children and adolescents aged 5–19 found that male youth suicide rates were equivalent to female adolescent rates (Ben Khelil *et al.*, 2021). These Tunisian findings warrant further investigation, as there has been limited attention given to suicide, primarily due to its widespread perception as a taboo subject with limited national statistics available.

### Morocco

In Western Mediterranean regions such as Morocco, concern exists that there are no reliable registrations of death or suicide, and suicide deaths are often misclassified due to religious and social stigmatisations (Zarrouq *et al.*, 2015). A 2015 cross-sectional study by Zarrouq and colleagues assessed suicidal ideation and related behaviours among adolescents in Morocco, including death or self-harm ideations, including those with suicidal plans as well as suicide attempts in the past month (Zarrouq *et al.*, 2015). Among 3020 adolescents, female gender, low family income, middle school level education, and having divorced parents were significantly associated with suicidal behaviours (Zarrouq *et al.*, 2015). Suicidal ideation, suicide planning, and suicide attempts prevalence among all adolescents were found to be 15.7, 6.3, and 6.5%, respectively. The authors cite the higher suicide rate among male adolescents as determined by genetic vulnerabilities, gender differences in early adverse environments, neurodevelopment, and social expectations, while noting that the overall lower suicide rates in Muslim communities may be related to cultural protective factors (Zarrouq *et al.*, 2015).

### Turkey

As with Tunisia and Morocco, adolescent suicide rates in Turkey are overall low, though a recent Turkish study found that the rate of suicide amongst male adolescents and emerging results was concerningly rising (Kartal *et al.*, 2022). As well, the prevalence of suicidal ideation among Turkish adolescents increased by 17.9% in

2018 (Canbaz & Terzi, 2018). Identified risk factors included female gender, usage of alcohol and addictive drugs, being in physical fights, having no close friends, and experiencing bullying. Smoking frequency was higher in the group with no suicidal ideation, while the use of alcohol and drugs in the last month was higher in the group with suicidal ideation. For these risk factors, higher odds ratios existed amongst females than male adolescents.

### Iran

Although studies have been conducted to determine the rate of suicide among the general population of Iran and have been recently reviewed (Asadiyun & Daliri, 2023), there are limited studies on the prevalence and factors of suicidal ideation specifically among adolescents and emerging adults. Among the general Iranian population, the rate of death by suicide among men (10 per 100,000) nearly doubles that of women (5.5 per 100,000) (World Health Organization, 2014). Ziaei and colleagues conducted a 2017 cross-sectional study to observe whether suicidal ideation was associated with specific risk factors of smoking, bullying, sexual abuse, alcohol consumption, feelings of loneliness, and negative parental support (Ziaei *et al.*, 2017). Among the 727 adolescents aged 15–17 included in the study, 4.1% ( $n = 30$ ) have thought about taking their own life, and of the suggested risk factors, current cigarette smoking OR = 3.00; 95% CI [1.69, 5.30], alcohol usage OR = 4.28; 95% CI [2.41, 7.59], and a history of sexual abuse OR = 2.63; 95% CI [1.32, 5.24] were significantly associated with suicidal ideation (Ziaei *et al.*, 2017).

### Lebanon

Among Lebanese adolescents aged 14–17, 28.9% report some form of suicidal ideation, and there are positive associations between higher suicidal ideation and factors such as psychological abuse, child physical abuse, alcohol dependence, social fear, victimisation/bullying, impulsivity, and internet addiction (Chahine *et al.*, 2020). Older age is associated with lower levels of suicidal ideation, whereas female adolescents with separated parents were more likely to report suicide ideation to their counterparts in a nuclear family (Chahine *et al.*, 2020). These findings were similar to a more recent national survey of school-going Lebanese (Dadras & Wang, 2023), in which, remarkably, almost half of the female adolescents in grades 7–12 reported having attempted suicide in the preceding year. The issues faced in Lebanon parallel other Arab countries, which may suggest that the factors listed above apply to other Arab adolescents.

### Continental Africa

The population of Africa is rapidly growing (Suzuki, 2019). The population trends and increased integration of Africa into the world's sociopolitical and economic community emphasise the importance of featuring this section of the world despite deficiencies in the availability of related data.

Mars *et al.* (Mars *et al.*, 2014) described in 2014 how less than 10% of African countries reported mortality data to the World Health Organization, and that only 16 countries had reported suicide incidence rates (Mars *et al.*, 2014). The quality and reporting of data have since improved, but there remains a question regarding the quality of suicide and suicide attempt data in Africa.

To date, the most robust data has been collected from South Africa. Kootbodien *et al.*, note in their longitudinal study from

1997–2016 some consistent trends with other regions among the general population, including suicide mortality higher in men than women, and suicidal ideation being more prominent in women (Kootbodien *et al.*, 2020). Approaching the end of the 20-year study period, Kootbodien *et al.*, report that in 2016, the odds of dying by suicide were greatest among the adolescent and emerging adulthood group aged 15–29 years.

Among individuals that have a primary school education level and above, as the level of education increased, so did the risk of dying by suicide ( $p < 0.001$ ) (Kootbodien *et al.*, 2020). The occupation type also posed as an independent risk factor, as those in education had the highest prevalence of suicide. Unemployment remains an independent risk factor, and those who were unemployed had an increased probability of suicide (Kootbodien *et al.*, 2020).

Suicide methods match many other regions of the world. Hanging was the leading method of death by suicide (60.6%) in men, and poisoning was the leading method of suicide in women (21.9%) (Kootbodien *et al.*, 2020). Interestingly, death by firearm in men decreased over the 20-year period, which has been largely accredited to stricter gun control applied in South Africa through the Firearms Control Act (FCA) of 2000 (Kootbodien *et al.*, 2020). Contrary to the Global Burden of Disease report in 2016 (Naghavi, 2019), Kootbodien and colleagues observed a gradual increase in suicide mortality in South Africa.

In addition to a relative lack of local resources for suicidality identification and prevention, stigma concerning suicide also impacts progress in this region. Suicide is not an option to certify a cause of death in many African countries (Osafo *et al.*, 2020), and several African countries have outlawed suicide, which significantly contributes to data quality and hinders prevention efforts (Ochuku *et al.*, 2022).

Youth suicide rates of 15–19-year olds varies by African sub-region (World Health Organization Regional Office for Africa, 2022). South Africa had the highest crude suicide rates, with 50 per 100,000 for males and 10 per 100,000 for females. Central Africa's crude suicide rate for 15–19-year old's was 21 per 100,000 for males and ~5 per 100,000 for females, while East and West Africa had comparable rates of ~5 per 100,000 for males and ~2 per 100,000 for females. The countries with the highest rates of 15–19-year-old suicide crude rates for each sub-region were Lesotho in South Africa, Central African Republic in Central Africa, Mauritius in East Africa, and Benin in West Africa (World Health Organization Regional Office for Africa, 2022). The pattern in the region of increased suicide mortality amongst young men is clear.

### South Asia

South Asian suicide rates are high compared to the global average, and there is a need to address the limited national-level data on suicide rates among adolescents (Jordans *et al.*, 2014; Irish & Murshid, 2020). This can be accomplished through establishing new or evaluating current suicide surveillance systems, as well as by increasing psychosocial interventions, access to mental healthcare services, and peer support groups.

### Bangladesh

A retrospective cohort study among youth aged 11–17 in Bangladesh (Irish & Murshid, 2020) found that the incidence rates of past-year suicidality (having considered or planned

suicide) within the previous year (2019) was 9.3%, and risk factors for suicidality included bullying (OR = 2.23, 95% = 1.16–4.31,  $p < 0.001$ ) and having anxiety (OR = 2.91, 95% = 1.32–6.42,  $p < 0.001$ ). Having a friend was found as a protective factor (OR = 0.29, 95% = 0.19–0.43,  $p < 0.001$ ). Of note, there were not any significant differences between sex or age and study outcomes (Irish & Murshid, 2020).

### Bhutan

Suicide is an important public health issue within Bhutan and has an incidence rate of 10 per 100,000 among all ages (Dema *et al.*, 2019). Among 5809 adolescents aged 13–17 years in one school-based study, 667 (11.6%) reported suicidal ideation and 656 (11.3%) reported suicidal attempts within the past year (Dema *et al.*, 2019). Key risk factors for the suicidal rate among adolescents were identified as female gender, food insecurity, bullying, sexual violence, loneliness, lack of sleep, and drug abuse (Dema *et al.*, 2019).

### India

India overtook China in 2023 to become the most populated country in the world, and suicide is the most common cause of death for Indians aged 15–29 (Dandona *et al.*, 2018). As such, it is a crucial nation to consider. Notably, in contrast to the majority of other countries and regions, the WHO dataset shows that women aged 15–19 die from suicide (14.55 per 100,000 crude rate) at over double the rate of age-matched young men (6.71 per 100,000 crude rate) (World Health Organization, 2024) (Figure 1, Table 1). Across the 15–29 age range male youth more commonly die by suicide than females (Dandona *et al.*, 2018), while among adolescents aged 10–18 years of age, suicide rates between men and women are nearly equivalent (Yadav *et al.*, 2023). An older study specifically of rural populations in southern India of adolescents aged 10–19 found very high rates of suicide and that young women died by suicide at nearly triple the rate of young women (148 per 100,000 for women vs. 58 per 100,000 for young men) (Aaron *et al.*, 2004). Taken together, these findings suggest the benefit of further study of youth suicide in India in light of its status as a rapidly developing nation. As shifts in urbanisation, globalisation, and other factors affect the youth population, data may more consistently match global trends.

Thippaiah and colleagues (2019) summarise the importance of universal, selective, and indicated interventions for suicide prevention in India. Universal indications include training mental health human resources, community-based interventions, technology-based suicide prevention, media reporting, and psychology first aid. The authors highlight among these interventions the importance of observing adolescent behaviour through school-based mental health programmes involving teachers and parents, fostering life skills, and monitoring adolescent interaction with social media. A 2020 cross-sectional study was conducted on adolescents aged 10–19 years from Indian states, Uttar Pradesh and Bihar to assess risk factors for suicidal ideation (Cherian *et al.*, 2020). It was found that suicidal ideation is more common among adolescent females, and that adolescents with a history of physical or sexual abuse and high/severe depression (Cherian *et al.*, 2020). Youth suicide in India has been recently reviewed with an emphasis on creating a foundation for a national suicide prevention policy (Gupta & Basera, 2023), conveying the progress that is being made in this progressing country.

## Nepal

Mental health is underfunded in Nepal, as it is allocated less than 1% of the total healthcare budget (Pandey *et al.*, 2019). Among 6529 adolescents in grades 7–11 in a 2019 cross-sectional study, 13.59% ( $n = 887$ ) considered suicide and 10.33% ( $n = 674$ ) had attempted suicide (Pandey *et al.*, 2019). Food insecurity (OR = 2.32, 95% CI = 1.62–3.32), anxiety (OR = 2.54, 95% CI = 1.49–4.30), loneliness (OR = 2.51, 95% CI = 1.44–4.36), and female gender (OR = 1.39, 95% CI = 1.03–1.89) were significant risk factors for suicidal ideation (Pandey *et al.*, 2019).

## Pakistan

In Pakistan, adolescents aged 15–19 comprise 10.37% of the sizeable population of 221 million (Imran *et al.*, 2022). An ecological study found that among 279 suicides in this population, common methods of suicides included ingestion of poisonous substances (50%,  $n = 140$ ), hanging (35%,  $n = 97$ ), and usage of firearms (7.5%,  $n = 22$ ) (Imran *et al.*, 2022). There were minimal differences in suicide reports among genders (Imran *et al.*, 2022).

## Sri Lanka

Sri Lanka is a low- and middle-income country with a population of 22 million, with one-fifth being adolescents (Rasalingam *et al.*, 2022). A 2022 cross-sectional study was conducted to determine the prevalence of mental health issues, including suicidal ideation among this demographic (Rasalingam *et al.*, 2022). Among the 3262 adolescents in the study, 3.7% ( $n = 121$ ) reported suicidal ideation, and increased parental engagement, close friends, and physical activity were protective factors (Rasalingam *et al.*, 2022).

## East Asia

Developed East Asian regions, including Japan, South Korea, Taiwan, and Hong Kong witnessed youth suicide rates in both sexes increase in the early 2000s in Japan and South Korea and in the 2010s in Taiwan and Hong Kong (Chang *et al.*, 2022; McLoughlin *et al.*, 2015; Kølves & de Leo, 2017; Padmanathan *et al.*, 2020; Chen *et al.*, 2021). Rising youth suicide rates suggest a general deterioration of mental health in young age groups in this region: A parallel increase in depression, sleep disorders, suicidal ideation, and self-harm was also observed (Lee *et al.*, 2021). Factors contributing to the worsening of youth mental health in East Asia include disruptions of family structure, increasing social inequality, escalating academic stress with limited employment returns, and heightened suicide risks associated with internet use (Park *et al.*, 2014; Porter, 2016; Chang *et al.*, 2022; Y.Y. Chen *et al.*, 2023). The permissive, or even honourable, attitude towards suicide in East Asia (Russell *et al.*, 2017a; Wang *et al.*, 2022) combined with rapid social changes and cultural conflicts, have paved the way for the recent rise in youth suicide rates in developed East Asian countries.

Rooted in Confucian collectivistic culture, the region emphasises social solidarity and cohesiveness (Lin & Yi, 2013; Zhang *et al.*, 2005). With rapid Westernisation and individualisation, however, old and new values have become conflicted. The younger generations bear the brunt of the rapid social changes and value conflicts. For example, divorce is still very much stigmatised in East Asia, where less than 5% of births occur out of wedlock (Porter, 2016; National Development Council, 2018; Organization for Economic Cooperation and Development, 2022). However, divorce rates doubled in the 1990s–2000s in these East Asian

countries, from approximately 1 to more than 2 per 1000 people in 10 years (M. Dommaraju & Jones, 2011; Chen & Yip, 2018; Yip *et al.*, 2012), indicating that increasing numbers of children and adolescents are growing up in divorced families where divorce is still regarded as a taboo and a social problem (Raymo *et al.*, 2015). These youth live with the social discrimination of being reared in ‘broken families’, and the association between divorce rates and the recent escalation in youth suicide rates in East Asia has been demonstrated in several empirical studies (Porter, 2016; Chang *et al.*, 2022).

Over and above the changes in family structure, the immense transformation of corporate systems might also contribute to the rising suicide rates of East Asian youths. With capitalisation and liberalisation, the Japanese-style lifetime employment system, which used to be widely practiced in Japan, South Korea, and Taiwan, declined at the turn of the century (OECD iLibrary, 2021). The younger generations now face insecure and non-regular jobs, even while they were taught through Confucianism teachings that education is a way to access power, enhance social mobility, and attain status. Yet, diminished educational returns and unstable employment conditions are likely to contribute to rising suicide rates, particularly in young people in the region (Chen *et al.*, 2021).

The association between the internet and youth suicide has been widely recognised (Sedgwick *et al.*, 2019). The internet and social media have made the dissemination and modelling of suicide and suicidal behaviour quick and easy (Chang *et al.*, 2022). In addition, cyber-bullying is a known risk factor of youth suicide (Keles *et al.*, 2020). In the collectivistic East Asian culture, the internet is also a platform to find companions to perform group suicide (Russell *et al.*, 2023).

Youth suicides in developed East Asia regions are also characterised by a small male-to-female suicide rate ratio, usually slightly higher than 1; much lower than the male-to-female suicide rate ratios of 3–4 observed in many Western countries (Chang *et al.*, 2019). Note that in the WHO data set, South Korea has a higher rate of suicide among young women aged 15–19 than among young men (10.97 per 100,000 for young women vs. 8.93 per 100,000 for young men, Figure 1, Table 1) (World Health Organization, 2024). In addition, building jumping is a common suicide method as the regions are highly populated, and high-rise buildings are widely available (Yip *et al.*, 2021).

Overall, East Asian youth are in crisis, and social fragmentations, diminished life opportunities, normalisation of suicides through the internet, and the easy accessibility to lethal suicide methods (i.e., high-rise buildings) all contribute to the increasing youth suicide rate trends in both sexes in East Asia (Chang *et al.*, 2022; Y. Y. Chen *et al.*, 2021; Wang *et al.*, 2022; P. Yip *et al.*, 2021; Y. Y. Chen *et al.*, 2023). Potential interventions include improving access to mental health support for young people in crisis, collaborating with online platform providers to monitor and remove harmful social media content, and promoting mental health literacy while reducing the stigma associated with mental disorders. Further research is necessary to evaluate the effectiveness of these approaches and identify additional strategies that may be helpful in preventing youth suicide in East Asia.

## China

Youth and adult suicide rates in China have been declining from 23.2 per 100,000 in the late 1990s to 8.1–9.8 per 100,000 in the early 2010s (Wang *et al.*, 2014). The 2019 data from the WHO finds a rate of 2.90 per 100,000 among both sexes of adolescents aged 15–19

with an approximate 1.5 : 1 ratio of male to female suicides (World Health Organization, 2024). Studies have identified the decline to factors such as increased economic development and urbanisation (Wang *et al.*, 2020). As China's gross domestic product (GDP) has quadrupled over the past decade, its effects have substantially improved the quality of life in both rural and urban regions (Cao *et al.*, 2015), perhaps mitigating rates of suicidal behaviour and suicide. Urbanisation decreases suicide rates as those living in rural areas in the late 1990s in China were three to four times more likely to commit suicide than that of urban areas (Phillips *et al.*, 2002). Transitions in the work force from agricultural to industrial result in reduced availability of pesticide ingestion (Page *et al.*, 2017). Despite the downtrend throughout the years, suicide still accounts for 19% of all deaths and remains the leading cause of death among youth aged 15–34 years old (Zhao & Zhang, 2014) and especially women in middle to late adolescence (Zhang *et al.*, 2019).

While China constitutes a significant portion of the global population and now contains the second-largest adolescent population in the world, longitudinal epidemiological data on suicidal rates and suicidal behaviour in Chinese adolescents remains limited, and few are based on national data (Hu *et al.*, 2023). In traditional Chinese culture, suicide is associated with a substantial stigma. This stigma leads to feelings of shame when reporting instances of suicidal behaviour and a reluctance to participate in studies related to suicide. These cultural factors may contribute to the relatively low incidence rates of suicide in China (Ma *et al.*, 2009).

Existing data highlight an interesting contrasting pattern in gender-related differences in suicidal behaviour between China and other global regions. Suicidal ideation and behaviour as with many of the reviewed regions are more prevalent in Chinese female adolescents than Chinese male adolescents, but there is a relatively low female-to-male ratio of 1.2–1.3 (Liu *et al.*, 2019). 17.6% of male youth and 23.5% of female youth experienced lifetime suicidal thoughts, 8.9% of male youth and 10.7% of female youth experienced lifetime suicidal thoughts with a plan, and 3.4% of male youth and 4.6% of female youth had attempted suicide, marking a lifetime rate of all three suicidal behaviours to be higher in females than males (Liu *et al.*, 2019). In the same study, male youth were more inclined to employ lethal methods such as jumping off high buildings or suicide by hanging, while female counterparts were more likely to utilise stabbing/cutting methods (Liu *et al.*, 2019).

Regarding urban-based adolescents, the literature discusses risk factor patterns similar to that of Western countries, where females, who were more likely to report suicidal ideation than males (38.09% vs. 29.95%) suicidal behaviours were attributed to school performance, study anxiety, self-accusation tendency, impulsive tendency, and physical symptoms (Tan *et al.*, 2018). In the first meta-analysis on the prevalence of suicidal ideation and suicide attempt in the general population of mainland China, it is noted that the lifetime prevalence of suicidal ideation in women aged 15 years and older was 1.7-fold the prevalence in men (4.9% vs. 2.8%), while the lifetime prevalence of SA in women was 1.1% versus 0.5%, approximately 2.2 times the rate than in men (Cao *et al.*, 2015).

The literature also highlights trends in suicidal behaviour between different geographical regions. Suicide rates in rural communities are much higher than those of urban populations in people aged 15 years and older (Sun & Zhang, 2017). The lifetime prevalence of suicidal ideation in rural areas was 1.3-fold that of urban regions (4.3% vs. 3.3%), whereas the lifetime prevalence of

suicide attempts showed similar rates (0.9% vs. 0.7%) in rural and urban settings. Studies have attributed the higher rates in rural areas to be associated with easier accessibility to more lethal methods, such as toxic organophosphate pesticides (Cao *et al.*, 2015). Another phenomenon seen is the parental migration from rural to urban areas for better work opportunities, resulting in parents having to leave their children under 18 years of age at home, otherwise known as 'left behind children' (LBC). While this has led to higher earnings and increased social status within the family, the absence of parental support has had adverse effects on rural adolescents, also seen higher in girls than boys (C hang *et al.*, 2017).

Considerations for identifying unique gender-specific factors that correlate with increased suicide risk in Chinese adolescents have been explored but are still scarce in current publications. Of those reviewed, one study examined a group of individuals who attempted suicide with subsequent medical complications aged 15–54 in rural China, and when compared with controls, there was little variation in the risk factors between genders; the factors were consistent with those in Western countries, including lower levels of education, family suicide history, negative life events, and lower social support. However, when comparing by sex, females tended to never be married, have peasant occupations, hold strong religious beliefs, and have less of a social support system, while male attempters were more associated with having a physical disease or mental disorder (Sun & Zhang, 2017).

In the context of traditional Chinese marital dynamics in rural areas, societal norms dictate females to be subservient to males. The lack of autonomy may lead them to be more susceptible to psychological issues leading to increased suicidal behaviours as opposed to males. Additionally, given their higher levels of religiosity, females may encounter societal disapproval due to these unwanted thoughts, which could escalate the risk for suicidal behaviour.

## Oceania

Oceania is a geographical region comprised of the island nations between Asia and the Americas. Its main continental landmass is Australia and includes the regions Melanesia, Micronesia, and Polynesia. The most populated countries of Oceania are Australia, Papua New Guinea, the Indonesian territory of Western New Guinea, New Zealand, the American territory of Hawaii, Fiji, the Solomon Islands, Vanuatu, and the French territories of New Caledonia and French Polynesia.

The WHO Global School-Based Student Health Survey (2009–2013) of adolescents aged 12–18 demonstrated that the prevalence of suicide attempts among young adolescents was highest in the Western Pacific region (28.6%) (Liu *et al.*, 2018). Furthermore, the prevalence among of suicide attempts for young boys in the Western Pacific region was higher (31.2%) than the prevalence of suicide attempt among young girls (26.8%), a finding that contrasts with the global trend. The prevalence of suicide attempts in adolescents is highest in Samoa, where almost two-thirds (61.2%) of adolescents reported a prior suicide attempt in the preceding year (Liu *et al.*, 2018). This very high rate may be interpreted with caution, and a more recent study found a past year point prevalence of suicide attempts of 21.8% among adolescents aged 13 to 17 in Samoa (Sarfo *et al.*, 2023). Several countries in the region including Samoa, Tuvalu, and Vanuatu have high prevalences of suicide attempts among young male adolescents relative to female adolescents (Liu *et al.*, 2018), which contrasts with global trends.

Several theories exist to explain the high rates of suicide in the region (Lowe, 2019). Colonial and globalising forces have contributed directly and indirectly to the breakdown of traditional cultures among Pacific Islanders (Lowe, 2019). Suicide via poisoning with pesticides and agricultural toxins is a common method in Oceania, as it is readily accessible (Mathieu *et al.*, 2021). Early substance use initiation is prevalent and a risk factor for suicidality among adolescents aged 13 to 16 years (Peltzer & Pengpid, 2015), as are other traditional risk factors including bullying and victimisation (Sharma *et al.*, 2017). Framing prevention efforts within socioeconomic contexts within the diverse island communities and cultures (Fu *et al.*, 2021) will remain an ongoing task to reduce the high rates of youth male suicide in the region.

## Discussion

Suicide among men in adolescence and emerging adulthood is a leading cause of mortality worldwide (World Health Organization, 2021b). A recent systematic review of sixty-seven studies found young men in this critical developmental age to be at more than double the risk for death by suicide relative to young women across the globe (HR 2.50, 95% CI 1.8–3.6), while suicidal behaviour without death, often the key event precipitating the receipt of healthcare services, are higher among women (OR 1.96, 95% CI 1.54–2.50) (Miranda-Mendizabal *et al.*, 2019). The higher rate at which young men die by suicide and the lower rate by which young men may present with suicidal behaviour and thereby receive healthcare services prior to death together emphasise the importance of advancing the study of this at-risk group.

This paper demonstrates the intricacies of male suicide and suicidal behaviour in this critical developmental period by surveying the similarities and differences across the regions and countries of the world. Adolescent suicide rates in adolescence differ substantially by country (Figure 1, Table 1) and by region (Figure 2, Table 2). These differences in suicide are informed by the histories and contemporary sociocultural surround that impact the subjective experience and availability of care for the young man. Despite unique facets of countries and regions across the globe, certain key mediating cultural factors and developmental elements are universal. This is especially so in a time of increasing globalisation and Westernisation of the developing world, perhaps seen most presciently in the changes discussed in the sections concerning India and China.

In our discussion, we highlight substance use and TMI as two major global risk factors for male youth suicidality. We also explore the impact of culture, religion, and economics through a focus on Westernisation, Catholicism, and Indigenous communities. We note the role of biology in adolescence and emerging adulthood through a focus on androgens. We conclude with clinical reflections and directions for further study.

## Substance use

Adolescence and emerging adulthood are a vulnerable developmental period during which at-risk behaviours may emerge (McGue & Iacono, 2008). These behaviours can significantly impact an individual's health and are potentially linked to disabling disorders in adulthood. Notably, dysfunctional behaviours related to substance abuse and addiction often originate during adolescence, posing significant public health challenges that are closely connected to increased morbidity and mortality on a

global scale (Das *et al.*, 2016). This is increasingly a worldwide priority as economic development and globalisation shifts population health risks (Degenhardt *et al.*, 2016a).

Substance abuse and dependency among young men are of critical concern in the realm of behavioural health, and they carry extensive consequences that affect individuals, families, and communities. Moreover, they have a significant and complex impact on society as a whole (Sussman *et al.*, 2008). Notably, the Coronavirus Disease 2019 (COVID-19) pandemic saw a dramatic increase in adolescent substance use, particularly alcohol use, with a more significant rise observed among Canadian males (Dumas *et al.*, 2020). Canadian adolescent males, compared to females, engage in the use of illicit substances, particularly alcohol, both individually and in social settings with peers to a significantly greater extent than Canadian adolescent females (Dumas *et al.*, 2020).

However, recent findings from a national survey of American high school students in grades 9–12 (Centers for Disease Control and Prevention, 2023) suggests that this traditional gender gap of greater substance use among adolescent males has closed and even reversed among alcohol, cannabis, and nicotine in the United States: Whereas in 2011 male American high school students reported higher rates of current alcohol, electronic nicotine, and cannabis use (39%, 26%, and 26%, respectively) relative to their female counterparts (38%, 23%, and 20%, respectively), by 2021, 27% of female American high school students had drunk alcohol in the preceding thirty days as compared to 19% of their male counterparts, 21% smoked electronic nicotine-containing products as compared to 15% of males, and 18% smoked cannabis compared to 14% of males. Updated and country-specific, regional, and global data will be needed to continue to monitor and generalise these trends.

Almost 4% of the global burden of disease is attributed to alcohol use in general (Room *et al.*, 2005). The abuse of and dependence on alcohol among adolescents aged 12–15 is on the rise in many countries in the world (Smith *et al.*, 2024), posing a significant health and social challenge, although recent data globally the overall trend is a modest decline (Smith *et al.*, 2024). Declines in alcohol use have generally been greater among young men than young women (Centers for Disease Control and Prevention, 2023; Pape *et al.*, 2018), though select groups at risk for suicide such as the undeserved appear to not follow this trend (Pape *et al.*, 2018). These findings align with evidence showing that adult men in the US are more likely to have elevated blood alcohol levels when dying by suicide (Kaplan *et al.*, 2014). Additionally, Italian research (Grigoletto *et al.*, 2020) indicates that there has been a significant increase in the number of cases of alcohol intoxication presenting to the emergency department in adolescents and young adults, particularly immediately after the pandemic lockdown period. Engaging in substance use, whether alone or with peers, constitutes risky behaviour. Solitary drinking was found to be associated with at-risk symptoms such as loneliness, hopelessness, depressive symptoms, and suicidal ideation in a Korean study of college students (Ju *et al.*, 2019). Alcohol substantially increases the prevalence of suicidal behaviours in both males and females aged 13–15 years (World Health Organization, 2013). There are many possible pathways through which alcohol consumption may enhance suicide risk. First, alcohol intoxication may exacerbate anxiety, hopelessness, and cognitive dysfunction, and it may worsen problem-solving or decision-making abilities related to suicidal behaviours (Makhija & Sher, 2007). In addition, over time, alcohol misuse may negatively

impact social relations and social support, increasing the emergence and maintenance of suicidal thoughts and/or behaviours. Increased male adolescent substance use may exacerbate existing parent–child conflicts that are well-known as potentially triggering adolescent suicidal behaviour (Holland *et al.*, 2017). Exposure of male adolescents to parental substance use has been shown to increase the likelihood of substance use among adolescent offspring (Sigman, 2020). It can also affect the family-supportive functions for male adolescents through direct intoxication and may lead to instances of domestic violence (Campbell, 2020), ultimately contributing to functional impairments among adolescents.

This is particularly relevant for the LACs, where parental substance use disorders are a risk factor for suicide in the offspring (Ministerio de Salud y Protección Social, 2017). A comparative study conducted by the UN Office on drugs and crime in 2006 found that in nine Latin American countries, alcohol is the substance of choice by adolescents, followed by cannabis (Oficina de las Naciones Unidas contra la Droga y el Delito, 2006). Regional literature unanimously concluded substance use to be a contributing factor for higher mortality rates in male teenagers (Bella, 2013).

For instance, in a regional case–control study conducted by Böttcher and Garay in 2021, which compared adolescents and young adults aged 15–26 years who had attempted suicide with a control group, it was found that the mean alcohol consumption in the suicide cases was 3.5 times per week, whereas in the control group, it was 1.26 times per week. For other substances, such as illicit drugs, the average consumption in the suicide cases was 0.53 times a week, and in the controls, 0.20 times a week (Böttcher & Garay, 2021).

### *Traditional Masculinity ideologies (TMI)*

Gender role socialisation entails the process of acquiring and internalising the values, attitudes, and behaviours associated with femininity or masculinity. Through gender role socialisation, young men learn to be emotionally restricted, self-reliant, dominant, and even aggressive (Levant & Richmond, 2016a). The traditional masculinity ideologies (TMI) that build on this, such as Stoicism, Self-Reliance, Toughness, and Dominance, begin to emerge in late childhood and adolescence, leading male adolescents to think that they must cope with problems on their own (Levant & Richmond, 2016a). Thus, compared to young women, young men are generally less likely to seek help when they feel psychologically distressed, and this seems especially true for those who strongly endorse TMI (Eggenberger *et al.*, 2021, 2022). Understanding TMI may be especially important in relation to the reasonable expectation that increasing available behavioural healthcare services will reduce early male suicide; if young men do not make use of services, these services' positive impact will not be realised.

Indeed, men with a strong endorsement of TMI are more than twice as likely to die by suicide than men with low TMI endorsement (Coleman *et al.*, 2020). Men with high TMI endorsement also appear to be at a much higher risk of suicide when experiencing a loss of status (Walther *et al.*, 2022). While we await similar studies exploring the impact of TMI in adolescence, the adult literature in this regard can guide appropriate intervention points for children and adolescents.

Gender role socialisation and the subsequent endorsement of TMI have increasingly been recognised as risk factors for male

suicide. This acknowledgment opens opportunities for suicide prevention approaches and psychotherapeutic interventions specifically designed for boys and men to challenge dysfunctional TMI and promote positive masculinities (Seidler *et al.*, 2016; Ogrodniczuk *et al.*, 2018; King *et al.*, 2022; Frey *et al.*, 2023; Walther *et al.*, 2023). However, the effectiveness of these newly developed interventions tailored for boys and men in reducing male suicide rates will need to be demonstrated through upcoming randomised clinical trials.

Furthermore, there is continued evidence that the endorsement of TMI is to be regarded as a trait and not variable over time (Borgogna & McDermott, 2022), as it is passed on from one generation to another (Perales *et al.*, 2023). The current TMI definition is more closely aligned with Western masculinity as the majority of the research was done in the United States and, to a lesser extent, in other Western countries. Since masculinity ideology varies by culture (Lin & Yi, 2013), more research is needed in other cultures to corroborate the established findings or to reveal culture-specific differences. Nevertheless, the consistent difference between adolescent male and female suicide rates in most countries might be partially explained by the pervasive TMI shared among adolescent males, irrespective of cultural differences.

## **Culture, religion, and economics: Westernisation, Catholicism, and Indigenous communities**

### *Culture: westernisation*

Despite the presence of world-leading healthcare systems in developed regions such as Europe and North America that can provide treatment for psychiatric conditions and thereby lower suicide risk, a complex interplay of factors inherent in Westernisation, such as societal achievement pressure and undervaluing behavioural health, may contribute to the high suicide rates among adolescents and emerging adults in this region.

For example, one Hungarian study showed that between 1998 and 2006, the prescriptions of antidepressants and lithium for persons under 20 years of age increased by eightfold, while the suicide rate of this age group declined by 11 per cent (Otuyelu *et al.*, 2015). These data demonstrate that the positive impact of improved depression treatment can extend to the overall suicide rates in the general population, even including individuals under the age of 20. There is evidence that the increasing prescription of antidepressants, contributing to the decline in suicide rates in several countries in North and South America, as well as within the European Union (Ludwig *et al.*, 2009; Gusmão *et al.*, 2013).

Yet, simultaneously, the strong achievement culture prevalent in developed nations places young men in these Westernised societies are often under immense pressure to succeed academically, professionally, and socially (Curran & Hill, 2019). This intense focus on achievement can lead to feelings of failure or worthlessness in those who struggle to meet these high expectations, causing them to perceive suicide as the only way out (Wilkinson & Pickett, 2009). As Westernisation and globalisation spreads to other regions of the globe, studies will be needed to evaluate the impact on male youth of the interplay of the benefits of increased access to care coupled with these pressures.

Additionally, the high quality of healthcare systems in these countries may contribute to a sense of complacency about health and life. With advanced medical care readily available, individuals might take their well-being and overall quality of life for granted (Mackenbach, 2012), inadvertently undervaluing the importance

of mental health. This can result in a lack of awareness or understanding of mental health issues (Wahlbeck & Makinen, 2008), as well as a reluctance to seek help for psychological distress (Clement *et al.*, 2015).

Moreover, the stigma surrounding mental health problems and help-seeking behaviours, particularly among young men who adhere to traditional masculinity ideologies, could further exacerbate the issue (Seidler *et al.*, 2016). These individuals may be less likely to seek help when facing psychological distress, leaving them more vulnerable to suicide (Eggenberger *et al.*, 2021, 2022). These factors will be important to explore as developing nations and regions may acquire both the benefits and the risks to early male suicide rates of cultural considerations.

### Religion: catholicism

Some studies in developed (Hilton *et al.*, 2002) and developing nations (Euseche & Muñoz-García, 2022) have shown that young people identifying with a religious belief appear to be at a reduced risk for suicidal thoughts and suicide. Religion, including the Muslim faith in portions of Africa and Oceania and in the Middle East, along with Catholicism in Latin American countries as well as in portions of Africa and the Mediterranean, may serve as a protective factor against early male suicide and account for generally lower rates of suicide in these regions and their constituent countries. However, a systematic review showed that data is mixed, and that it is important to consider the many dimensions and facets of religion, and that in general, religion appears to protect against suicidal behaviour but not suicidal ideation (Lawrence *et al.*, 2016). For example, one Mexican study showed religion to be protective against suicidal ideation amongst adolescents (Hoffman & Marsiglia, 2014b). There may additionally be regional differences, with one study among the general population showing religion to be protective in Latin America and Eastern and Western Europe but a risk factor for individuals in East Asia, Western Europe, and Southern Europe (Hsieh, 2017).

The widely held assumption that the Catholic religion is an intrinsic element of Latin American culture and that it serves as a protective factor against suicide requires examination. In the 19th century, Durkheim noted that suicide varied across religions (Catholicism and Protestantism) and introduced the concepts of social regulation and integration. He argued that Catholics had more social cohesion, connectedness to community resources, among other factors that made them less prone to suicide when compared with protestants (Lawrence *et al.*, 2016). Although we cannot extrapolate these findings and apply them entirely to the young Latin American population, these concepts are fundamental to understanding religion in a region where Catholicism has been the main religious affiliation since the Spanish conquest and subsequent colonisation. Another aspect to consider is that less industrialised countries often adhere to more traditional values that strongly disapprove of suicide. This can result in the misleading appearance of lower suicide rates when in reality, it may be attributed to underreporting and misclassification of deaths.

Later, other theorists refined Durkheim's postulates, highlighting that it is the quality of the social networks associated with religion, attendance at religious services, and one's perception of God, rather than the religion itself, that serves as a protective factor against suicide (Lawrence *et al.*, 2016). In recent years, there has been a significant trend of secularisation in the Western world, including in the LAC countries. This shift towards a more

individualised concept of God and spirituality has displaced traditional religious values and can offer insights into the complex dynamics surrounding these issues.

Another interesting phenomenon in this region is the coexistence of long-standing religious beliefs with violence. A possibility could be that similarly to religion, gangs and crime organisations represent a new form of community that is attractive to the younger generations. It is in these crime organisations that different values arise, and diverse forms of violence are legitimised. More studies that analyse how religion can be protective against suicide but not against violence are needed.

### Economics: Indigenous communities

Another common observation among the studies is that suicidality increases during economic crisis (Böttcher & Garay, 2021a). Globally, men in developed countries in particular experienced increased rates in suicide associated with the 2008 financial crisis (Chang *et al.*, 2013). A global systematic review of suicide in economic recession (Oyesanya *et al.*, 2015) found the need for further studies in low-income counties. To address this gap, we will focus on the impact on LAC countries and their Indigenous communities.

It was estimated that the pandemic caused a -9.1% reduction in GDP in 2020 for the 33 countries in LAC, deepening the proportion of the population living in poverty (Cárdenas, 2021). Particularly vulnerable communities to economic stressors were youth in South America from Indigenous populations who have the highest mortality rates when compared to their non-Indigenous counterparts (Montenegro & Stephens, 2006). Mortality rates alone are higher for infants, children, and adolescents from these populations (United Nations, 2021). Although it varies by country, a PAHO report found that suicide was the second leading cause of death in Indigenous youth aged 10-19 years old (Pan American Health Organization, 2019).

Indigenous populations are unevenly distributed across the Americas, and percentages vary from 0.2% to 71%. In a series of articles by the Lancet in 2006, it was reported that Bolivia had 5 million Indigenous citizens, which was 71% of the total population. On the other hand, Mexico had 14 million Indigenous persons, but this number only represents 13.9% of the total population of 95 million inhabitants (Montenegro & Stephens, 2006).

Overall, there are 400 aboriginal tribes in LAC, which roughly represent 10% of the total population in the region, but 89% of them live in five countries: Bolivia, Guatemala, Peru, Ecuador, and Mexico (Pan American Health Organization, 2019). These distributions can be explained by the European invasion that decimated ancestral tribes, subsequent colonisation, structural marginalisation, and, more recently, the lack of governmental recognition and pervasive stigmatisation (UNICEF, 2012). The aforementioned factors result in misclassification and further obfuscation of mental health and suicide levels in Indigenous populations. Indigenous youth face additional challenges, such as carrying the burden of Aboriginal intergenerational trauma, lack of representation in a Westernised continent, discrimination, isolation, and poor access to mental health services (Pollock *et al.*, 2018). Another common denominator for the majority of this ethnic groups is the disproportionate burden of poverty. Today, the Indigenous populations account for 14% and 17% of the poor and extremely poor in the subcontinent, respectively (World Bank Group, 2015). This is relevant as low socio-economic status has been extensively associated with higher rates of suicidality

(Iemmi *et al.*, 2016). In a region where the poverty map overlaps the Indigenous territories (United Nations, 2021), this is extremely concerning. Further studies are needed concerning suicide rates among male youth in Indigenous communities, especially as these communities rapidly evolve with the impacts of Westernisation and globalisation.

### Biology: androgens

A significant number of studies suggest that testosterone is related to suicide risk (Roland & Morris, 1986; Markianos *et al.*, 2009; Sher *et al.*, 2012, 2014, 2021, 2022; Sher, 2018; Tripodidakis *et al.*, 2007; Zhang *et al.*, 2015). Studies indicate that both high and low testosterone concentrations may play a role in suicidal behaviour (Sher, 2018). For example, it has been observed that, among combat veterans, morning plasma free and total testosterone levels were lower in suicide attempters in comparison to individuals without a history of suicide attempts (Sher *et al.*, 2021). Some studies, however, did not find a link between testosterone and suicidality (Butterfield *et al.*, 2005; Perez-Rodriguez *et al.*, 2011). For example, one study did not find a difference in testosterone levels between male suicide attempters and male healthy controls (Perez-Rodriguez *et al.*, 2011). It has also been proposed that suicidal behaviour in adolescents and young adults is associated with high testosterone levels, whereas suicidality in older men is associated with decreased testosterone secretion (Sher, 2013). The effect of high testosterone levels on suicidality in adolescents and young adults may be mediated by testosterone-related elevated aggression. Several years ago, researchers proposed the androgen model of suicide (Lenz *et al.*, 2019). They suggested that in utero androgen exposure and adult androgen levels synergistically enable suicide.

Studies of the relation between testosterone function and suicidality are in their infancy. Therefore, it is not possible to discuss the link between testosterone and suicidality in the context of an international survey of suicide. It is to be hoped that future research of the relation between testosterone and suicidality will provide significant insight into the aetiology of suicide.

### Conclusion

The issue of suicide among young men in adolescence and emerging adulthood is one of the most important social and public health problems worldwide (Abraham & Sher, 2019). It is present on all continents and in all countries.

The issue of suicide among male adolescents and young men does not get sufficient public attention. It is not addressed sufficiently by politicians and policymakers. This may partially be related to the stigmatisation of young people's psychiatric problems, including suicidality on a global level, in addition to the shortages of mental health professionals and non-specialist health workers on a global level (Patel *et al.*, 2007). Resources to diagnose and treat suicidal male adolescents and young suicidal men are insufficient even in developed, high-income countries, and they are limited in middle- and low-income countries. More resources to address this crucial public health issue are needed.

Effective management and prevention of substance abuse among male adolescents and young men are necessary to reduce suicides. This includes psychotherapeutic, behavioural, and pharmacological treatment of substance use disorders, social help, public education, and police work to fight drug trafficking

(Degenhardt *et al.*, 2016). These interventions are possible outside of Western contexts, such as in India (Jiloha, 2017).

Some male adolescents and young men do not seek mental health help (Lindsey *et al.*, 2006; Hassett & Isbister, 2017; Clark *et al.*, 2018). Reasons are multifactorial (Radez *et al.*, 2021) and include elements of TMI. Additionally, the hesitance among young men to engage in mental healthcare may sometimes be related to a lack of training and responsiveness from some psychiatrists and other clinicians who may not treat depressed and/or suicidal young men empathically. Suicidal patients may evoke a range of adverse countertransference reactions (Michaud *et al.*, 2023), and men who identify with traditional male gender roles may over-rely on defensive avoidance of engagement in the psychotherapy process which may preclude an easy entry into a therapeutic alliance (Deering & Gannon, 2005).

In summary, the emotional health of young men in men in adolescence and emerging adulthood is an important topic (Rice *et al.*, 2018). Suicide prevention amongst this cohort may be advanced in specific countries through an understanding of the international context and global trends.

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