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Review

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Global trends in teenage suicide: 2003–2014

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Summary

The object of this article is to review the past decade of research on teenage suicide, with a particular emphasis on epidemiologic trends by age, gender and indigenous ethnicity. As such, a review of research literature from 2003 to 2014 was conducted via a comprehensive search of relevant psychological and medical databases. Wide gaps in our knowledge base exist concerning the true extent of teenage suicide due to lack of data, particularly in developing countries, resulting in a Western bias. The gender paradox of elevated suicidality in females with higher completed suicide rates in males is observed in teenage populations worldwide, with the notable exceptions of China and India. Native and indigenous ethnic minority teens are at significantly increased risk of suicide in comparison to general population peers. Often those with the highest need for mental health care (such as the suicidal adolescent) have least access to therapeutic support.

Globally, suicide in teenagers remains a major public health concern. Further focused research concerning completed suicides of youth below the age of 18 is required across countries and cultures to understand more about risk as children progress through adolescence. Gender and ethnic variations in suicidality are embedded within cultural, historical, psychological, relational and socio-economic domains. Worldwide, the absence of child/adolescent-specific mental health policies may delay the development of care and suicide prevention. Overall, it is vital that clinicians adopt a holistic approach that incorporates an awareness of age and gender influences, and that cultural competency informs tailored and evaluated intervention programmes.

Overview

In recognition of the significant public health issue of suicide, the World Health Organization (WHO) has published '*Preventing Suicide: A Global Imperative*' (2014), in which actionable steps in the context of developing a wide-ranging multisectoral strategy towards suicide prevention[1] has been outlined. The global target is to reduce suicide rates by 10% by 2020.[2]

For adolescents (although, there is a paucity of truly global epidemiological data available[3,4]), suicide continues to be a leading cause of mortality worldwide and remains a major public health concern.[5,6] The highest prevalence of adolescent

suicide across genders is evidenced in Southeast Asia[7] and Eastern Europe,[8,9] while it is the second leading cause of mortality in USA for teenagers between 15 and 19 years.[10]

This article is a 10-year update, following on a review of the previous decade of research in youth suicide carried out by Gould *et al.*[11] in which key suicide risk factors of youth psychopathology, family history of suicide, access to firearms and stressful life events were identified. Youth suicide rates were observed to decline significantly during this period. This 2014 review updates the field of teenage suicide research with a particular focus on recent epidemiological trends by age, gender and indigenous ethnicity.

Methods

As per the methodology of Gould *et al.*[11] and those employed in Bridge *et al.*[12] we conducted a review of extant research literature from 2003 to 2014 via a comprehensive search of PsycINFO, PubMed/MEDLINE and PsycARTICLES databases (Figure 1). Keywords employed in this search included: 'Adolescence', 'Teenagers', 'Suicide', 'Risk Factors', 'Ethnic variations', 'Gender' and 'Intervention'. For the purpose of this teenage review, examination centred on 12- to 19-year-olds (inclusive). However, relevant studies that incorporated adolescence in alternative age categories were not excluded (Table 1). Manual examination of major literature review references yielded further studies. Annual adolescent suicide mortality data from USA was accessed using the Web-based Injury Statistics Query and Reporting System program, with worldwide statistics retrieved from the WHO's World Mortality Database/Global Health Observatory Data Repository.[10,13]

Results

Demographic factors

Secular trends of completed suicide

Access to definitive global secular trends is affected by inter-country variability in reporting, reliability issues, consistent under-reporting of suicide[14] and a dearth of comparable international data that disproportionately represents developed countries. From data available, adolescent suicide rates through the past 20 years have generally stabilized and declined (see Organisation for Economic Co-operation and Development (OECD), Figures 2 and 3).[15] Decreasing rates have been linked to restriction of means, use of selective serotonin reuptake inhibitors and enhanced pesticide control (a significant factor in self-poisoning adolescent suicides in Eastern countries).[16] In addition, most countries with large decreases in suicide rates for 15- to 19-year-olds were found to be those with high suicide rates historically.[15] Conversely, a marginal increase in adolescent suicide rates was evidenced from 2008 to 2009, and more recently.[10,15] Whether this is directly attributable to the sequelae of recession-associated deprivation remains to be seen. Research indicates that recession-linked unemployment is an associative factor in completed suicide rates, with countries affected most severely by the economic crisis witnessing an increase in suicide rates.[17,18]

The OECD average rate is starkly contrasted by the 19–20 suicides per 100 000 teenagers evidenced by non-OECD post-Soviet countries in Eastern Europe.[9] Elevated rates in these countries may be linked to the attenuated social cohesion, isolation and social anomie[19] inherent in the experience of their changing economic and political structures, in the context of socioeconomic upheaval and deprived family backgrounds.[8] Family disadvantage (linked to 90% of teenage suicides) and alcohol use have been cited as important determinants of the incidence rate in Russia, where it is postulated that under-reporting of adolescent suicide is very much commonplace.[8]

Age as a risk factor for youth suicide: an epidemiological transition

Although suicide is considered very rare in childhood and early adolescence,[20] occurrence is likely to be underestimated in this age group because of the reluctance of coroners to give the verdict of suicide.[21] It is widely recognized that chronological progression through adolescence is associated with increased incidence of completed suicide, increasing significantly in older adolescents before stabilizing in early adulthood and maintaining this level until the sixth decade.[11] This is reflected in a global rise from 0.6 per 100 000 completed suicides in youth under 14[22] to a mean suicide rate of 7.4/100 000 in teenagers aged between 15 and 19 years worldwide.[4] In 2012, the Centers for Disease Control and Prevention in USA registered the suicide mortality rate for 10- to 14-year-olds at 1.48 per 100 000 and completed suicides of 15- to 19-year-olds at 8.35 per 100 000 in 16 states.[10] An age-related epidemiological transition for suicide through later adolescence has also been identified in Ireland and UK; as evidenced by an accelerated pattern of risk up to the age of 20[23] (see Figure 4).

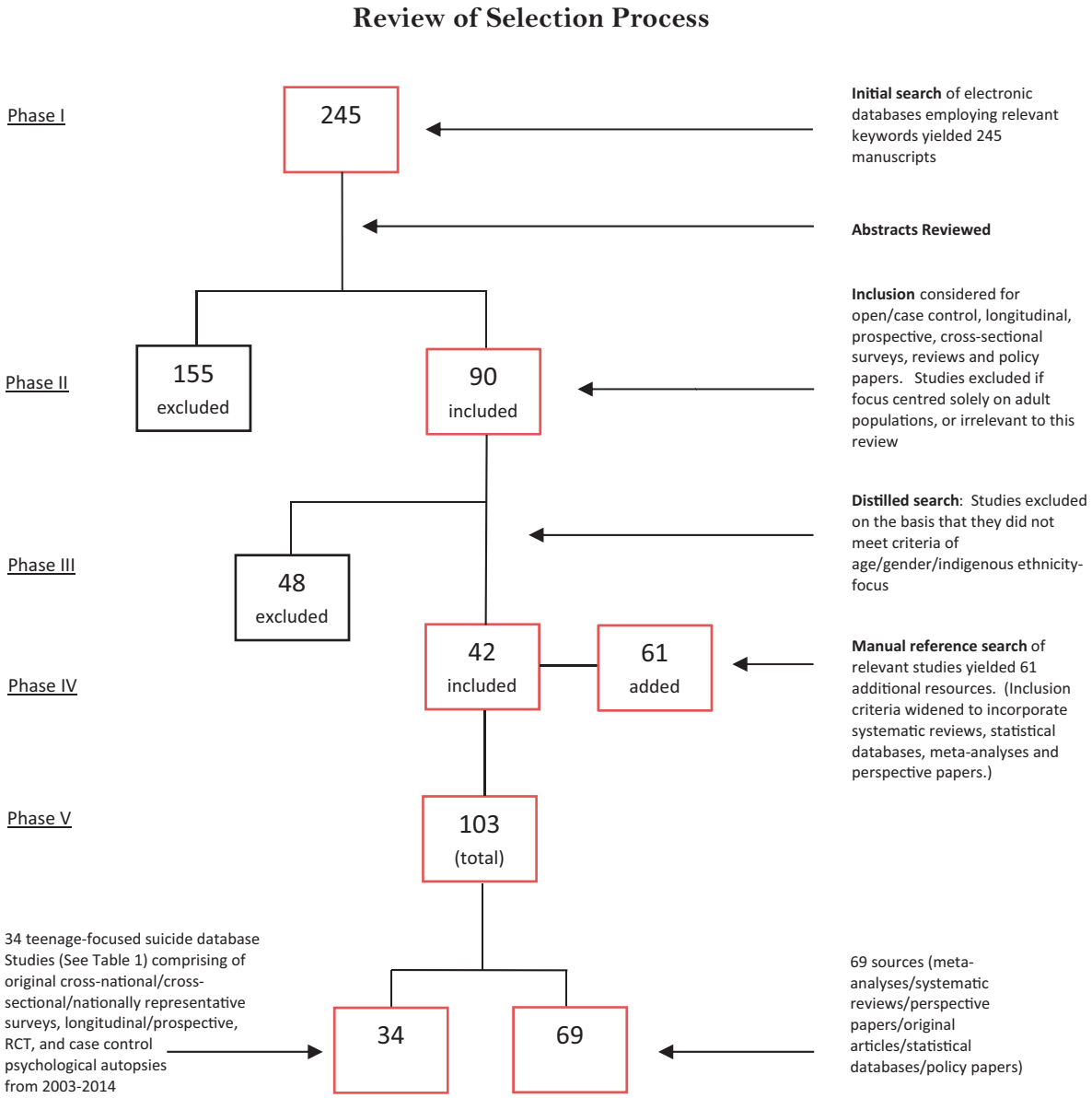

Figure 1. Selection process for literature review.

Most of the international statistics on global teenage suicide rates are derived from the WHO Mortality Database, and more recently from the Global Health Observatory Data Repository,[13] which provides mortality information for 5–14 and 15-to 29–year-olds. While this database is invaluable, by focusing on these age bands, year-on-year data on completed suicides and the risk that progressing through adolescence infers on suicidality is not clearly elucidated. In addition, the justification for grouping 15- to 19-year-olds and 15-to 29-year-olds in the same age category may make statistical sense when interpreting what is a statistically rare event, but the difference between a 15- to 19-year old and 20- to 29-year old in a cognitive, emotional and developmental sense is vast, and as such, demands access to a more distilled data set for analysis.

Gender

In tandem with the well-established gender paradox of suicidality,[24] female teenagers are generally much more likely than males to experience suicidal ideation and attempts,[25–33] yet males complete suicide more frequently than females.[11,12,24,25,33] Worldwide, over twice (2.6: 1) as many males between 15 and 19 years complete suicide (4.1 per 100 000 for females and 10.5 per 100 000 for males).[4] Higher completed suicide rates among males

Table 1 Global adolescent studies

Authors	Study	Key findings	Age	N	Location
Cross-national surveys					
Page *et al.*[59]	Global School-based Health surveys (GSHS)—Developing Countries	Average prevalence of suicidal ideation across countries: 15.3%	13–15 years	266 694	Worldwide (49 countries)
Kokkevi *et al.*[55]	European School Survey Project on Alcohol and Other Drugs (ESPAD)	Average lifetime suicide attempt prevalence across countries: 10.5%. Frequent thoughts of self-harm median: 7.4%. Significant associations found with gender/family integrity/socioeconomic status/substance use.	15–16 years	45 806	Europe (17 countries)
Blum *et al.*[30]	Cross-national study of rural/urban regions	15- to 19-year-olds and females were more likely to report suicidal ideation and suicidal attempts in comparison to 20- to 24-year-olds and males.	15–24 years	17 016	Vietnam/ China/ Taiwan
Whitbeck *et al.*[51]	Cross-national Study	Perceived historical loss among North American indigenous adolescents exerts independent effects on adolescent's depressive symptoms.	11–13 years	459	USA/Canada
Nationally representative studies					
Nock *et al.*[53]	National Co-morbidity Adolescent Supplement Survey Replication	Estimated lifetime prevalence: suicide ideation (12.1%), plans (4%), and attempts (4.1%)	13–18 years	6483	USA
Patel *et al.*[35]	Nationally representative mortality survey 2001 – 2003	A 15-year-old in India was found to have a cumulative risk of about 13% of dying by suicide before the age of 80. Around half of suicides linked to poisoning (pesticides).	All ages	1.1 million households	India (all regions)
Aseltine *et al.*[79]	National school-based screening Signs of Suicide (SOS) Program	HED is a risk factor for suicidal behaviour among younger teens.	11–19 years	32 217	USA
Han *et al.*[77]	Korea Youth Behavioral Risk Factor Surveillance Study 2006	Heavy drinking and cigarette smoking were found to be significantly associated with suicidal ideation and suicidal attempts among teens across genders.	<19 years	70 486	South Korea
Schilling *et al.*[80]	National school-based screening Signs of Suicide (SOS) Program	The use of alcohol while upset or depressed viewed as a marker for suicidal behaviour in adolescents who did not report ideating prior to a suicide attempt.	11–19 years	31 953	USA

(continued)

Table 1 Continued

Authors	Study	Key findings	Age	N	Location
Swahn and Bossarte[78]	National Youth Risk Behaviour Survey (NYRB) 2005	Alcohol use among adolescents, especially preteen alcohol use initiation, is a risk factor for suicide ideation and suicide attempts across genders.	High School Grades 9–12	13 639	USA
Cross-sectional regional surveys					
McMahon *et al.*[25]	Annual suicide rates compared with rates of self harm via hospital-treated self-harm (Irish National Registry of Deliberate Self-Harm) and rates of self-harm in the community (Child and Adolescent Self-harm in Europe study)	Completed suicide rate found to be six times higher in males. Girls twice more likely to deliberately self-harm. Elevated risk of suicide for males who have self-harmed.	15–17 years	25 002: Population 775: hospital presentations with self-harm 3881: Child and Adolescent Self-harm in Europe study.	Ireland
Sampasa-Kanyinga *et al.*[92]	Cross-sectional regional school-based survey	Victims of cyberbullying and school bullying are at a significantly increased risk of suicidal ideation, plans and attempts in comparison to non-bullied counterparts.	14.3 ± 1.8 years	1658 girls, 1341 boys	Canada
Espelage and Holt[89]	Cross-sectional analysis	Involvement in bullying (in any capacity) is linked to increased risk of suicidality.	10–13 years	661	USA
Cross-sectional regional surveys					
Hepburn *et al.*[88]	School-based self-reported survey analysis	Urban youth who have been bullied as well as those who have bullied others are at increased risk of suicidal ideation and suicide attempts.	13–19 years	1838	Boston
Kaess *et al.*[32]	Population-based cross-sectional Study (116 schools)	Gender differences in non-fatal suicidal behaviour attributed to gender variations in emotional and behavioural problems in teens.	Average age 14.8 years	5512	Southern Germany
Miller *et al.*[76]	Mexican Adolescent Mental Health Survey (MAMHS), Multi-stage probability household survey	Suicidality among adolescents is related to use of alcohol and drugs and use/dependence on tobacco	12–17 years	3005	Mexico City
Skapinakis *et al.*[83]	School-based cross-sectional survey (Epirus School Project)	Older teenage victims of bullying are more likely to express suicidal ideation	16–18 years	Phase 1 =5614 /Phase 2 =2431	Greece

(continued)

Table 1 Continued

Authors	Study	Key findings	Age	N	Location
Brunstein Klomek *et al.*[86]	Self-report survey analysis 2002–2004	Victims of bullying and bullies are at high risk of depression, suicidal ideation and suicide attempts. The most troubled teenagers are both victims and bullies.	13–19 years	2342	New York State
Fekkes *et al.*[81]	Cross-sectional school-based survey	Being bullied is associated with depression and experience of psychosomatic symptoms.	9–12 years	2766	The Netherlands
Mills *et al.*[84]	Cross-sectional analysis	Victims of bullying more likely to experience depression, suicidal ideation and attempts.	12–15 years	209	Ireland
Eisenberg *et al.*[82]	Secondary analysis of anthropometric and survey data	Teasing about body weight associated with suicidal ideation and attempts.	12–19 years (Grades 7–12)	4746	USA
Longitudinal and prospective studies					
Bannick *et al.*[91]	Longitudinal study	In girls, bullying victimization was significantly associated with mental health problems after controlling for baseline mental health, whereas, in boys cyberbullying victimization was not related to poor mental health outcomes	Baseline: 12.5 years (mean) Follow-up: 14.31 years (mean)	2008–2009: 8272 2010–2011: 3181	The Netherlands
Klomek *et al.*[90]	Longitudinal study	Frequent involvement in school bullying (as a victim, bullying perpetrator or bully-victim) elevates the risk for later depression and suicidality beyond other well-established risk factors of suicide.	13–18 years Follow-up: 2 Years	96: Victims/ Bullies/Bully-victim 142 'suicide at-risk' youth (not involved in bullying behaviour)	New York State
Swanson and Colman[95]	Longitudinal study	Exposure to suicide predicts suicide ideation and attempts in teenagers.	12–17 years	12–13 years = 8766 14–15 years = 7802 16–17 years = 5496	Canada
Kim *et al.*[85]	Prospective study	Bullying reported to independently increase the risk of suicidality among bullying victims and victim bullies.	13–14 years (Grades 7–8)	1655	South Korea

(continued)

Table 1 Continued

Authors	Study	Key findings	Age	N	Location
Kaminski and Fang[87]	Secondary analysis of data from 3 US cohorts Data Set 1: National longitudinal study (Add Health) Data Set 2: YRBS/CDC Data Set 3:Linkages Survey (CDC)	Adolescents who reported more frequent victimization by peers found to be more likely to report suicidal ideation and suicidal behaviour.	Data Set 1: 11–21 years Data Set 2: 12–18 years Data Set 3: 12–18 years	Data Set 1: 18 676 Data Set 2: 12 133 Data Set 3: 3667	USA
Nrugham *et al.*[26]	Longitudinal study	History of a previous suicidal act significantly predicted a later suicidal act.	13.7/14.9/20 years	T1 (2464) T2 (345) T3 (265)	Norway
Longitudinal and prospective studies					
Prinstein *et al.*[27]	Longitudinal study	Between one-fifth and one-quarter of participants attempted suicide within 18 months post-discharge (the majority of attempters had attempted suicide prior to hospital admission.) There was a 13.9% re-attempt rate in the 3 months post-discharge.	12–15 years	143 psychiatric inpatients/ post-discharge	USA
Groholt *et al.*[29]	Longitudinal study	Independent predictive effects on suicidality included: the presence of hopelessness, co-morbid disorders, having a father exert control without affection and having ever received treatment for psychiatric or behavioural problems.	Average, 16.9 years	92 (90% female) 9 years post index attempt	Norway
Aaron *et al.*[36]	Prospective study using a verbal autopsy method 1992–2001	Suicides accounted for 50–75% of all deaths in young women and about 25% in males.	10–19 years	108 000 (in total)	Southern India
Randomized controlled trials					
Wilkinson *et al.*[28]	RCT Adolescent Depression Antidepressants and Psychotherapy Trial (ADAPT)	A previous history of non-suicidal self-injury prior to treatment is a clinical marker for further suicide attempts.	11–17 years	164 adolescents with Major Depressive Disorder	Britain
Psychological autopsies/case control studies					
Gould *et al.*[100]	Retrospective population-based, case–control study	An association was identified between newspaper reports of suicide (including specifics) and subsequent initiation of teenage clusters.	13–20 years	48 clusters/95 matched control communities	USA

(continued)

Table 1 Continued

Authors	Study	Key findings	Age	N	Location
Zhang *et al.*[39]	Case control psychological autopsy	Cultural value strain (particularly female gender role-related value strain) found to be a risk factor for suicide in rural China.	15–34 years	392 suicides/ 416 living controls	Rural Counties China
Li *et al.*[38]	Case control psychological autopsy	Independent risk factors: presence of any depressive symptoms within 2 weeks of suicide, low quality of life in the month before death, severe life events within 2 days before death and acute stress at time of suicide.	15–24 years	114 suicides/ 91 deceased controls	China

are linked to their greater propensity to have compounding risk factors for suicidality, such as the presence of co-morbid conduct and alcohol abuse disorders, their choice of more lethal suicide attempt methods, higher levels of aggression/inclination towards violence and externalizing behaviours, rendering boys more likely to make a lethal suicide attempt than teenage girls.[12,32-34]

Contra-wise, a higher suicide rate among teenage females is evident in countries such as China and India (particularly southern India).[4,35,36] The reason that adolescent suicide rates for females are higher in these countries (as opposed to Western and developed countries) could be attributed, in part at least, to the tenet that intergenerational and gender conflicts are more distilled and pronounced in traditional agricultural societies emerging into egalitarian industrial societies than in Western countries.[37] In China particularly, youth suicide patterns differ greatly to that in the West, where female rates are 60% higher than male rates and rural rates are 3-fold that of urban rates.[38]

Although the widespread availability of toxic pesticides in rural areas of China and Southern India is implicated in these higher female rates,[37,38] it may also be postulated that the increased risk of suicide among young teenage girls is linked to the greater likelihood of feelings of suppression and helplessness attached to their putative low social status within patriarchal and subjugating social and economic systems.[38,39] In these systems, it is apparent that more value is placed on male teenagers' contribution to society, leading to the promotion of a greater sense of security of his place within it. Adolescent females' sense of hopelessness may be compounded by heightened awareness of this injustice. In China specifically, it is averred that this leads to cultural value strain for female adolescents when modern values of gender egalitarianism confront the more traditionally hegemonic paternalistic values of pre-Communist Chinese society.[39]

Native and indigenous ethnic minority populations

Across New Zealand, Australia, Canada and USA, a similar pattern of high suicidality among indigenous youth is evident among teenage populations. In New Zealand (a country with one of the highest youth suicide rates for which comparative data is available),[40] Maori adolescents are 2.4 times more likely to die by suicide than non-Maori peers across genders.[41]

Echoing this pattern (albeit at an even higher rate), completed suicides of the teenage Aboriginal and

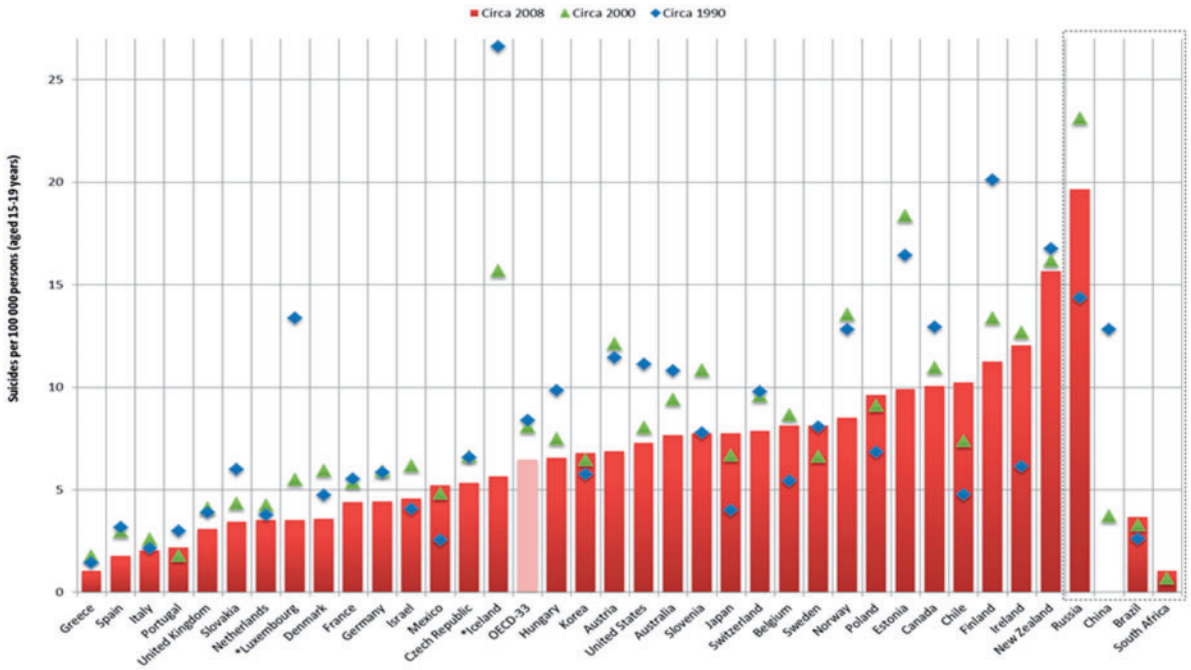

Figure 2. OECD trends in teenage suicide. Source: OECD–Social Policy Division–Directorate of Employment, Labour and Social Affairs. CO4.4: Teenage suicide (15–19 years old) adapted from WHO (2011), WHO Mortality Database.[15] OECD-33 refers to countries of the OECD, with the exception of Turkey as there is no data available). Russia, China, Brazil and South Africa are 'enhanced engagement OECD Countries'. There is no data available for China circa 2008.[15]

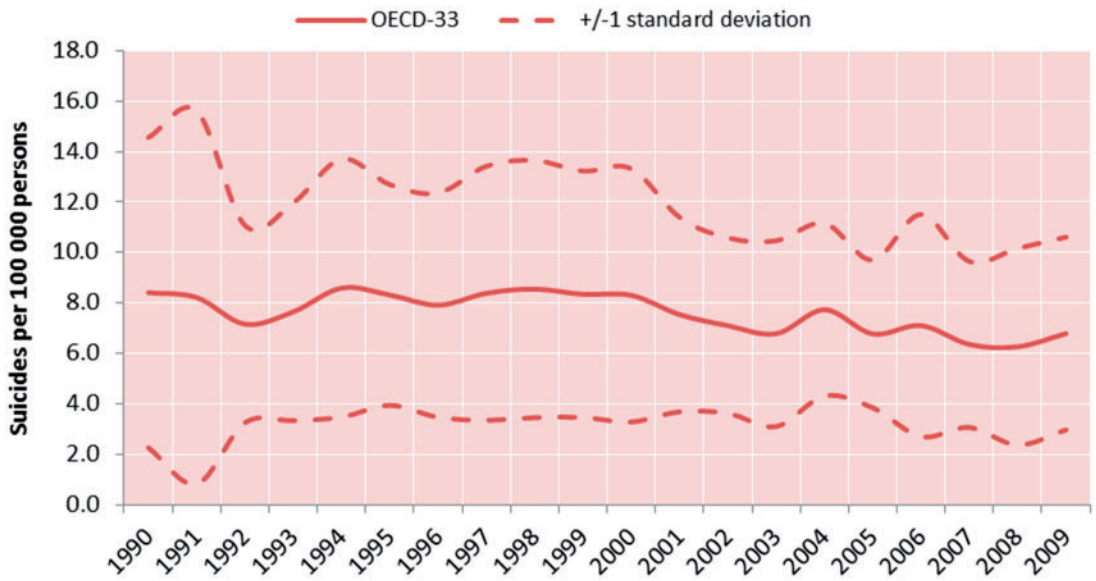

Figure 3. Chart CO4.1.A: falling suicide rates for most OECD countries. Source: OECD–Social Policy Division–Directorate of Employment, Labour and Social Affairs.[15] Suicides per 100 000 persons 15–19 years old, OECD-33 average from 1990 to 2009.

Torres Strait Islander population of Australia far exceed the rates of their non-indigenous counterparts.[42] From 2001 to 2010, suicide rates were found to be over 5.8 times higher among indigenous females aged between 15 and 19 years (18.7/100 000) in comparison to their non-indigenous contemporaries (3.2/100 000). Indigenous males aged 15–19 years were 4.4 times more likely (43.4/100 000) to complete suicide than their non-indigenous peers (9.9/100 000).[42]

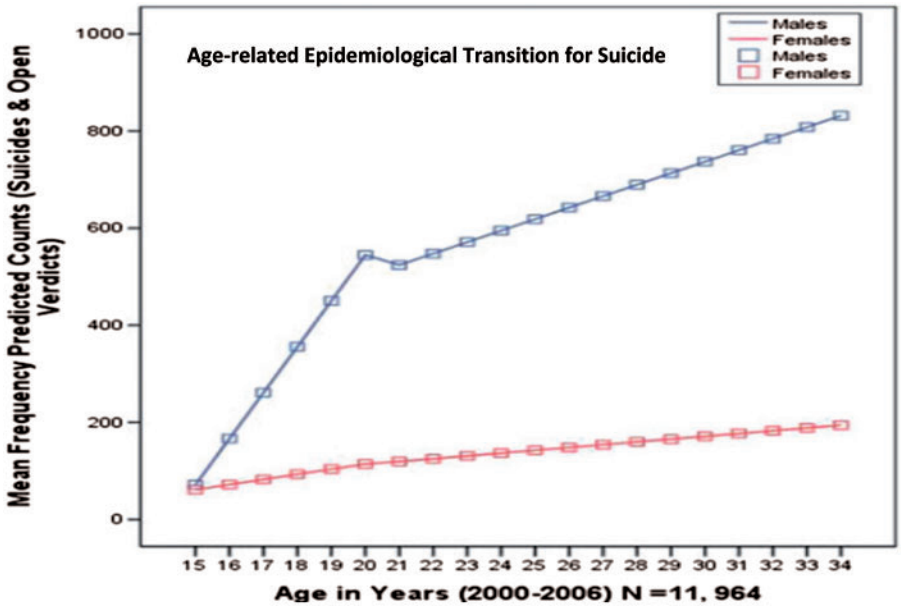

Figure 4. Frequency of suicide and open verdicts in the UK and Ireland by age (in years) UK and Ireland, 2000–2006. Source: Malone *et al*. Ageing towards 21 as a risk factor for Young Adult Suicide in UK and Ireland.[23]

Tantamount to patterns of escalated teenage suicide among native youth in antipodean countries, highly elevated rates are also evidenced in North America. For instance, in Canada, a First Nation adolescent is at significantly increased risk of suicide[43] with historical rates indicating that First Nation youth are five to six times more likely to die by suicide than a non-First Nation peer.[44] Notable variations within aboriginal populations occur however with Inuit Nunangat children and teenagers found to be up to 30 times more likely to die by suicide than their non-Aboriginal region peers in the rest of Canada.[45] In USA, Native American and Alaska Native teenagers (15–19) are over 1.7 times more likely to die by suicide.[10] Similarly, in Europe, 15- to 19-year-olds among the indigenous ethnic minority (IEM) of Ireland (Irish Travelling Community) have a completed suicide rate that is over 2.5 times the rate of the general Irish population, with a 6-fold increased male suicide rate.[46]

Factors that heighten risk for suicide among teenage IEM's include high prevalence of mental health disorders, increased substance and alcohol abuse and higher preponderance of exposure to social deprivation and stressful life events.[47-50] Elevated rates of suicidality could be related to exacerbating factors, including the loss of family links and community support, socioeconomic difficulties, marginalization, racism, loss of religious affiliation, inequality in education, cultural clashes with parents, thwarted hopes and lack of belonging.[50]

Such experiences are embedded within the context of history and culture that can encompass the involvement of trans-generational trauma, adolescent perceived historical loss,[51] acculturation, loss of land and social exclusion within the mainstream.[50,52] As such, native groups may be at increased risk of suicide, as a result of their exposure to an environment of relative disadvantage and inequality. This is rooted in the historical undermining and dismantling of cultural processes and structures, with subsequent ramifications for family functioning and impact on the construction of a sense of self.[52] Greater knowledge and understanding of elevated suicide risk in IEMs could provide new and deeper insights into the emergence of suicidality in other cultures and communities.

Psychosocial factors

Suicidal ideation, plans and attempts

Lifetime prevalence estimates of adolescent suicidal ideation range from 12.1 to 29.9%.[53-58] The results of a multi-country cross-national comparison of teenagers across 49 developing countries found that the average overall prevalence of reported suicidal ideation was 15.3%, with the region of Africa reporting the highest levels of 19.8%.[59] The lifetime prevalence of suicidal ideation in USA is <1% at 10 years of age; it gradually rises by 12 years of age, and then increases more acutely between 12 and 17 years of age.[53] Overall adolescent lifetime prevalence of direct self-injurious behaviour measured

by the Saving and Empowering Young Lives in Europe [54] project, across 11 European countries was recorded at 27.6%, while the European School Survey Project on Alcohol and Other Drugs (ESPAD) across 17 participating countries, reported frequent thoughts of self-harm (at least five occurrences) to be 7.4%.[55]

The greatest risk factor for completed suicide is a prior attempt.[12] Lifetime suicide attempts extend from an average of 4.1–10.5%.[53,55-58] The reported frequency of plans and attempts at 12 years remains <1% and subsequently rises through 15 years of age, before increasing in a more gradual fashion until 17 years of age.[53] Reasons for this escalation in suicidality through the adolescent period are attributable to an increased prevalence of suicide-risk psychopathology (namely depression and substance abuse) in older adolescents, with concomitant higher intent to complete suicide among older cohorts.[12,60] Suicidal ideation and previous attempts have been established as strong predictors of future attempts and completed suicide among adolescents.[25-29,61,62] Roughly a third of youth with suicidal ideation go on to develop a plan for suicide during adolescence, with around 60% of those with a plan proceeding to attempt suicide, mostly within the first year after the onset of ideation.[53]

The role of mental illness

It is well established that mental illness significantly elevates risk for adolescent suicide and suicidal behaviour, with major systematic reviews indicating that from 87 to >90% of youth present with a major psychiatric disorder at the time of suicide.[63-67] As such, mental health promotion warrants attention in terms of child health policy strategizing and implementation. Adolescents have attenuated voices and rights as a consequence of their restricted influence in the economic and political sphere, and the current evidence base regarding child and adolescent mental illness and suicide risk is not widely appreciated.[68] The extent of mental health difficulties in children and adolescents has not been sufficiently accepted and integrated into child-specific mental health policies by many governments worldwide.[69] In low-income and middle-income countries, the mental health needs of adolescents are especially neglected.[70] In terms of youth suicide intervention policies, it appears that there is an extreme scarcity of national programmes legislated throughout the world, with many countries with policies in place opting to treat adolescents under an adult/general population framework of care.[68]

Access to mental health services

Often those with highest need for mental health care (such as the suicidal adolescent) have least access to mental health services.[71] An analysis carried out by the WHO on child and adolescent mental health resources from 66 countries illustrated that in the vast majority of regions outside the Americas and Europe, there were no child and adolescent mental health services in place.[72] Less than half of the countries surveyed had a national policy that provided for children's rights, although this frequently centred on child protection as opposed to defined mental health needs of children. Other issues to emerge included, the lack of utilizing potentially available resources for child mental health services, the absence of standards for training and lack of supplemental training provision for individuals in contact with children who may require mental health support.[72] In cognizance of this, rights of children should be enshrined within international constitutions with a clear policy framework outlining best practice protocol for mental health promotion and safety, in the context of children's best interests and optimal survival and development in line with the United Nations Convention on the Rights of the Child.

Alcohol and drug use

From a neurobiological perspective, the developing adolescent brain may place teenagers at risk for substance abuse due to a proclivity towards impulsivity and sensation seeking, disregard of future outcomes, and a higher tendency to respond to reward stimuli than aversive stimuli in relation to adults.[73,74] Substance abuse infers a significant risk for teenage suicide, with alcohol, tobacco and drugs implicated in teenage suicide-related outcomes.[75-77] Alcohol use among adolescents, especially the initiation of use in the pre-teen, is an important risk factor for both suicide ideation and suicide attempts in girls and boys.[78] It has been demonstrated that youth (age 13) who reported an episode of heavy episodic drinking (HED) during the past year were found to be twice more likely to report a suicide attempt than youths >18 who reported HED and significantly higher than peers who did not report episodes of heavy drinking.[79] Furthermore, the use of alcohol while down or depressed has been established as a marker for suicidal behaviour in adolescents who did not report ideating prior to an attempt.[80] Thus, substance abuse is a specific accelerant in adolescence when mechanisms for regulating impulsivity and restraint are not fully matured, and where associated mood dysregulation confers added risk.

Bullying and peer victimization

For the developing adolescent in which the value placed on being accepted makes the experience of victimization such an acutely devastating experience, bullying can accelerate a pathway to suicide via the creation of variable levels of mental distress. Adolescents who report bullying by peers are significantly more likely to experience depression,[81,82] to experience/report suicidal ideation[83,84] and are at an increased risk of suicidal behaviour.[85,86] Moreover, frequent exposure to victimization/bullying or the perpetration of bullying has been found to be related to higher risks of depression, suicidal ideation and suicide attempts when compared with non-bullied/non-bullying counterparts.[86-90] The insidious advent of cyberbullying poses a new challenge as bullying assumes a faceless yet ubiquitous presence. Recent research explicates that victims of cyberbullying and school bullying are at a significantly increased risk of mental distress (girls specifically),[91] and suicidal ideation, plans and attempts, in comparison to teenagers who have not endured these threats.[92] Moreover, cyberbullying has been suggested to have stronger associations with suicidal ideation for adolescents in comparison to traditional bullying.[93].

Exposure and contagion

Exposure to suicide has been associated with increased self-harm and found to predict suicide ideation and attempts among teenagers.[94,95] Contagion refers to suicide as a 'socially contagious' process[96] that spreads via behavioural transmission between vulnerable individuals in groups or by way of social and general media.[97] A cluster of suicides, defined by spatial and temporal factors[97] can emerge via contagion, and more frequently affects teenagers and youth.[98] Overall, the percentage of teenage suicides forming part of a cluster has averaged between 1 and 2%, but in light of significant reported variations, it may be markedly higher.[97] The influence of media coverage of suicide stories on subsequent suicides appears to be highest for teenagers and youth,[99] with a significant association found between newspaper reports (that include specific suicide story details) and the subsequent initiation of teenage suicide clusters.[100]

Conclusions

This review focuses exclusively on teenage suicide worldwide in the context of epidemiological trends according to age, gender and indigenous ethnicity. Although teenage suicide rates have been demonstrated to stabilize and decline in many developed countries, the extreme dearth of data from developing countries, compounded by inconsistencies in completed suicide reporting worldwide, creates gaps in our knowledge base concerning the true extent of teenage suicide mortality.

In accordance with adult populations, teenage trends align with the gender paradox of suicidality. As such, more teenage boys complete suicide, while more girls experience suicidal ideation and attempts. Notable exceptions to this pattern are found in China and India where social structures differ from Western norms, and access to high-lethality pesticides may contribute towards inverting this paradox. In line with adult trends, this review also accentuates the fact that IEM teenagers are at a significantly elevated risk for suicide in comparison to their peers.

Mental illness, bullying, suicide contagion and substance use all heighten the risk of suicidality in young people. For many teenagers, access to mental health services remains a problem, with an obvious absence of child/adolescent-specific mental health policy in place. As clinicians, we have a statutory duty of care to safeguard the rights of children/adolescents. A right to adequate and appropriate mental health support should be afforded to children and enshrined in legislation.

There are significant challenges associated with suicide prevention and it has been described as an 'elusive public health goal' by some.[101] Successful prevention is likely to be a durational sum of small things including complementary approaches[102]; perhaps, through a society-wide positive knock-on effect, the whole is greater than the sum of the parts. Every teenager who dies by suicide has their own unique story, and the impacts for each individual family are profound.[103].

This review draws on international research in youth suicide over the past decade and extrapolates the multi-factorial contributions that mediate and modulate risk of suicidality in young people. Given the morbidity and mortality associated with youth suicide, there is a remarkable paucity of published database studies that have examined detailed indices of risk and comprehensive intervention studies with populations and sub-groups at increased risk (such as young people and indigenous ethnic minorities). Further systematic review is required. Intervention and prevention efforts to date are either non-existent, or generic, such that at-risk groups (including young people) are frequently excluded, marginalized or eclipsed from accessing support. This creates a milieu in which obstacles frequently outnumber signposts and access to care. Cultural competency should underline clinical

intervention with at-risk teenagers, with renewed efforts at more tailored and evaluated intervention and prevention research into suicide in young men, amongst whom the risk is greatest.

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