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Suicide rates in children aged 10–14 years worldwide: changes in the past two decades

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Background
Limited research is focused on suicides in children aged below 15 years.

Aims
To analyse worldwide suicide rates in children aged 10–14 years in two decades: 1990–1999 and 2000–2009.

Method
Suicide data for 81 countries or territories were retrieved from the World Health Organization Mortality Database, and population data from the World Bank data-set.

Results
In the past two decades the suicide rate per 100 000 in boys aged 10–14 years in 81 countries has shown a minor decline (from 1.61 to 1.52) whereas in girls it has shown a slight increase (from 0.85 to 0.94). Although the average rate has not changed significantly, rates have decreased in Europe and increased in South America. The suicide rates remain critical for boys in some former USSR republics.

Conclusions
The changes may be related to economic recession and its impact on children from diverse cultural backgrounds, but may also be due to improvements in mortality registration in South America.

Declaration of interest
None.

The suicide of a child is a tragic event, and although relatively rare, it is still a leading cause of death in children under 15 years old worldwide.[1] Despite growing research interest in the epidemiology of suicide, few studies have focused specifically on time trends of suicide in children aged 10–14 years or even younger. According to the studies by Mishara,[2] by the age of 10 years all children are aware of and understand the concept of death and suicide. In this paper we refer to the age group 10–14 years as 'children'; however, it must be acknowledged that this age group experiences periods of rapid developmental changes inclusive of pre-adolescence, puberty and the first years of adolescence. The World Health Organization (WHO) included child suicides in their statistics in the 1990s because of the high number of suicides in former Soviet bloc countries; however, some countries still do not present information about children below age 15 years in their official statistics.[3] Recent reports on child suicide are often limited to a single country or region, for example Canada, Ireland and England & Wales,[3–5] whereas studies of data from several countries are limited to rates for a single year (or latest available data[6]) and are very selective.[1] The aim of our study was to analyse suicide rates in children aged 10–14 years worldwide in two decades: 1990–1999 and 2000–2009.

Method

Absolute numbers of suicides for children (10–14 years old) classified according to gender were obtained from the WHO Mortality Database. Because population data were not given for several countries, the population numbers for the same age group were obtained from the World Bank data-set.

Statistical analysis

Taking into account the low incidence of suicide in children, average rates for the decades 1990–1999 and 2000–2009 were calculated. Poisson regression was applied when comparing the decades, and risk ratios with 95% confidence intervals were calculated. Countries with suicide data for at least 5 years per decade were included. This reduced our sample to 81 countries or territories (see online Table DS1). Because some countries were missing data on suicide for some years, we did not calculate the total suicide rate, but rather average suicide rates for the world and for specific regions, which were compared using paired sample *t*-tests. The analysis was performed with IBM SPSS version 20.0 for Windows.

Results

In the two decades examined, the average suicide rate of children aged 10–14 years in 81 countries has shown minor changes, with a small decline for boys (from 1.61 to 1.52 per 100 000; $t = 0.64$, d.f. = 80, $P = 0.521$) and a slight increase for girls (from 0.85 to 0.94 per 100 000; $t = -1.03$, d.f. = 80, $P = 0.309$). However, there have been significant changes in several countries (Table DS1).

Americas

The average suicide rates for children in South America (11 countries) showed a significant increase for both genders, from 1.04 to 2.32 for boys ($t = -2.72$, d.f. = 10, $P = 0.022$) and from 1.45 to 2.30 for girls ($t = -2.60$, d.f. = 10, $P = 0.026$). In 9 out of the 11 countries, the rate increased significantly for boys, and increased likewise for girls in 6 out of the 11 countries. In the decade 2000–2009, Guyana, Suriname and Ecuador had the highest rates in the world for girls, and Suriname had the second-highest rate for boys.

For Central America and the Caribbean (14 countries), there was no significant change on average, with boys having a rate per 100 000 of 0.86 in the 1990s and 0.89 in the subsequent decade ($t = -0.08$, d.f. = 13, $P = 0.938$); for girls, the respective rates were 0.82 and 0.74 ($t = 0.44$, d.f. = 13, $P = 0.666$). However, there was a significant increase for both genders in Mexico, and for boys in Nicaragua and for girls in Costa Rica. A significant decline was shown in El Salvador and Cuba for girls.

In North American countries, both genders reported a significant decrease in suicide rates in the USA, and a decrease only for boys in Canada.

Asia

Owing to incomplete or missing data, only a few countries and territories from Asia could be included in the analysis. Six south-eastern and north-eastern Asian countries or territories showed non-significant declines: from 1.01 per 100 000 in the 1990s to 0.89 in the 2000s for boys ($t = 1.25$, d.f. = 5, $P = 0.267$) and from 0.94 in the 1990s to 0.89 in the 2000s for girls ($t = 0.55$, d.f. = 5, $P = 0.605$). The Philippines showed a significant increase for both genders; South Korea had a significant decline for boys.

Seven central Asian countries (all former republics of the Soviet Union) demonstrated increasing rates: for boys from 2.27 per 100 000 in the 1990s to 2.81 in the 2000s ($t = -2.34$, d.f. = 6, $P = 0.058$), and for girls from 0.59 in the 1990s to 0.89 in the 2000s ($t = -1.73$, d.f. = 6, $P = 0.135$). Kazakhstan and Azerbaijan showed significant increases for both genders and Georgia an increase for boys. Furthermore, Kazakhstan had the highest rate in the world for boys aged 10–14 years (8.53), and this country's rate for girls was the fourth highest after the South American countries (2.86).

Other Asian countries included in the analysis were Israel and Kuwait from the Middle East. Kuwait had no case of child suicide in the second decade; Israel showed a significant decline for boys.

Europe

In Europe, the average suicide rate for boys declined significantly from 2.02 per 100 000 in the 1990s to 1.48 in the subsequent decade ($t = 3.19$, d.f. = 35, $P = 0.003$). Out of 36 European countries in the analysis, 14 demonstrated significantly decreasing suicide rates for boys. However, France and Romania showed a significant increase, although the average rate for girls did not change: 0.67 in the 1990s and 0.64 in the 2000s ($t = 0.43$, d.f. = 35, $P = 0.668$). No country reported a significant decline for girls; instead, a significant rise was measured in Belgium, Russia, Slovakia and Romania. Analysis of the European regions showed the highest rates occurred in eastern European countries, with a non-significant average decline for boys from 3.49 per 100 000 in the 1990s to 2.76 in the 2000s ($t = 1.66$, d.f. = 9, $P = 0.132$).

Other countries

Only Australia and New Zealand had data available for this analysis from Oceania; New Zealand showed a significant rate decline for boys. For Africa, Mauritius was included as the only country in the region with sufficient data for both decades, and here there was a significant drop in suicide for girls.

Discussion

Recent analysis of suicides throughout the world has indicated a shift in the magnitude of the problem from eastern Europe to Asia.[7] Further, a study of the effects of the 2008 global economic crisis revealed a strong impact on suicides in Europe and the Americas.[8] Our analysis of suicides in children aged 10–14 years in 81 countries over two decades showed a minor decline in the overall suicide rate for boys, from 1.61 to 1.52 per 100 000, and a slight increase for girls, from 0.85 to 0.94. Overall the problem seems to be shifting to South America (with rates highest in Guyana and Suriname), with a significant increase in 9 out of 11 South American countries for boys and in 6 countries for girls. Yet suicide rates remain critical in some former USSR republics such as Kazakhstan, Kyrgyzstan and Russia, where the rates are especially high for boys. Both regions have experienced significant economic and financial problems in recent decades. Factors such as unfavourable economic conditions, poor environment and parental unemployment are also contributors to suicide in children.[9] However, as shown recently, governments have an important role in implementing strategies to minimise the adverse effects of a country's economic recession.[10] As concluded by Hawton & Haw:

> recessions and their sequelae have wide ranging socioeconomic consequences – how governments respond may determine whether this is translated into despair and suicide.[11]

Although suicidal behaviours are often linked to mental disorders (especially mood disorders) at the individual level, prevalence of mental disorders in a given country or region may not be reflective of suicide rates at a national or regional level. A systematic review and meta-analysis of 116 epidemiological studies on the prevalence of major depressive disorder showed that point prevalence in the world was 4.7%, being lowest in North America (3.7%), east and south-east Asia (4.0%) and South America (4.0%), and highest in south Asia (8.6%) and in Africa and the Middle East (6.6%).[12] The authors detected a time trend, suggesting an overall increase with the time of major depression. However, children aged 10–14 years have a lower prevalence of mental health problems associated with suicide compared with the age group 15–19 years.[13]

It is important to note that the countries with the world's highest suicide rates for girls aged 10–14 years, Guyana and Suriname, are the non-Latin countries of South America, both with high proportions of south Asian (mainly Indian) population. Analysis of the Nickerie, the region with the highest suicide rates in Suriname, showed that the problem is concentrated in the younger Hindustani population.[14] High suicide rates have been shown in other Indian diaspora groups.[15] Another important factor contributing to increasing suicide rates in Central and South America is the high prevalence of different suicide risk factors in native ethnic groups. More specifically, there have been indications of changes in suicide rates of indigenous young people.[16,17] Analysis of groups in Australia showed that Aboriginal and Torres Strait Islander populations had a 2.2 times higher suicide risk, which was even more pronounced in children aged 5–14 years, with indigenous children having a 9.6 times higher suicide risk than non-indigenous children.[18] Pettersen & Vasques suggested a role for the high demands of academic performance, lack of family support and strict parental style, as well as sexual and psychological abuse of children and adolescents and widespread substance misuse in South America.[19] Substance misuse (mainly heavy alcohol consumption in the society) has been related to the suicide mortality of youth in Russia,[8] and in addition social media and overall media reporting have been blamed for recent clusters of teenage suicides in Russia.[20]

There is no systematic information about the causes of child suicide in Kazakhstan, which has the world's highest rate for boys aged 10–14 years and has shown an increase for both girls and boys.[22] Recent reports by the United Nations Children's Fund (UNICEF) consultant Robin Haarr gave some insight into the violence and suicidal behaviours of children in Kazakhstan.[23,24] The assessment of children's vulnerabilities to risk behaviours, sexual exploitation and trafficking showed that factors related to suicidal behaviours vary.[23] Often they are related to the multiple forms of violence, abuse, neglect and exploitation children experience in their lives, further complicated by stigmatisation and discrimination. A recent analysis of violence in schools in Kazakhstan revealed that children engaging in self-harming and suicidal behaviours were significantly more likely to witness and be the victims of school violence and discrimination by their peers, and they were also more frequently perpetrators of school

violence.[24] In addition, they experienced discrimination from school directors and teachers more frequently. Children engaging in self-harming and suicidal behaviours were also exposed to other factors such as family domestic violence and running away from home.[24]

The prevalence of suicide in children is likely to be underestimated owing to underreporting and/or misclassification of suicide deaths as accidental or undetermined. Research suggests that suicide may be more underreported among children than in adolescents and adults.[25] This might be due to social stigma and shame around suicide, coroners' reluctance to determine a verdict of suicide in a child or the misconception that children are precluded from engaging in suicidal acts owing to their cognitive immaturity.

Strengths and limitations

Important limitations of cross-cultural comparisons are the discrepancies in death classification, which might contribute differently to underreporting. Several countries changed their death recording classifications from ICD-9 to ICD-10 in the second part of the 1990s or in the 2000s. In addition, improvements in mortality registration have been indicated in South America; for example the Chilean registration system underwent improvements in 1997 which led to a decrease in cases with undetermined intent of death and might partially explain the increase in suicides there.[26] However, this might not be sufficient to clarify the ongoing increase in the 2000s.[26] The main limitation of our analysis is the absence of available data from African regions and from countries with large populations such as China and India. Furthermore, for some countries suicide numbers are relatively small for this specific age group; however, this limitation was overcome by calculating suicide rate per decade. The strength of the study is the inclusion of 81 countries or territories worldwide and the comparison of two decades, which makes this analysis the first systematic analysis of child suicide rates worldwide.

Implications of the study

Despite the problem that there are still countries that do not present child suicides in their official statistics, our study highlights the existence of child suicide as an important public health issue worldwide. Rates vary between countries, and are currently rising in South America and in some countries of the former USSR. There is a need for child-specific, country-level prevention activities and interventions acceptable for this specific age group.

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