

Addressing the rising rates of youth suicide: understanding causes and formulating prevention strategies using the iceberg model



Yi-Tzu Chang,^a Shu-Sen Chang,^{a,b,c,d,*} Lai Fong Chan,^e Ying-Yeh Chen,^{f,g} Qijin Cheng,^h Yasuyuki Shimizu,ⁱ Yuka Nishina,ⁱ Liang Zhou,^j and Paul Siu Fai Yip^{k,l}



^aInstitute of Health Behaviors and Community Sciences, College of Public Health, National Taiwan University, Taipei, Taiwan

^bGlobal Health Program, College of Public Health, National Taiwan University, Taipei, Taiwan

^cPopulation Health Research Center, National Taiwan University, Taipei, Taiwan

^dPsychiatric Research Center, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan

^eDepartment of Psychiatry, Faculty of Medicine, National University of Malaysia (UKM), Kuala Lumpur, Malaysia

^fTaipei City Psychiatric Centre, Taipei City Hospital, Taipei, Taiwan

^gInstitute of Public Health and Department of Public Health, National Yang Ming Chiao Tung University, Taipei, Taiwan

^hDepartment of Social Work, The Chinese University of Hong Kong, Hong Kong SAR, China

ⁱJapan Suicide Countermeasures Promotion Center, Tokyo, Japan

^jThe Affiliated Brain Hospital, Guangzhou Medical University, Guangzhou, China

^kDepartment of Social Work and Social Administration, Faculty of Social Science, The University of Hong Kong, Hong Kong SAR, China

^lHong Kong Jockey Club Centre for Suicide Research and Prevention, The University of Hong Kong, Hong Kong SAR, China

There is a concerning recent rise in youth suicide rates in several countries in the Western Pacific Region (WPR) such as Australia,¹ Hong Kong,² Japan,¹ South Korea,¹ and Taiwan.³ This commentary aimed to highlight recent youth suicide trends and propose strategies for further research, prevention, and intervention based on the iceberg model of youth suicidal behavior.^{4,5}

Based on data from 52 countries, Bertuccio et al.¹ showed marked variations in the suicide rates of 10–24-year-olds and their trends worldwide, with a concerning increase in countries like Brazil, the UK, the US, and several WPR countries. In Australia, the suicide rates of males aged 10–24 years increased 3.8% annually in 2009–2021.¹ In Japan and South Korea, the suicide rates of females aged 10–24 increased 18.9% in 2017–2020 and 16.7% in 2015–2020, respectively.¹ We, members of the International Association of Suicide Prevention (IASP)'s Partnerships for Life initiative in the Northern Western Pacific Region Steering Group (<https://www.iasp.info/partnershipsforlife/#boxzilla-21673>), also noted that the Hong Kong suicide rate per 100,000 youths aged 15–24 increased from 6.1 to 12.2 in 2014–2022,² and the Taiwanese suicide rates of youth aged 10–24 increased 11.5% annually in 2014–2019.³ There is an urgent need to

better understand the causes underlying such a rise in youth suicide in individual countries to inform prevention strategies.

Hawton et al.⁴ proposed an iceberg model of youth suicidal behaviour, demonstrating that suicide deaths represent only the visible tip, while suicide attempts, whether presenting to hospitals or not, constitute the larger, hidden portion of incidents of suicidal behaviours (Fig. 1). Suicidal ideation and mental health problems, as strong suicide risk factors,⁴ could be even more prevalent in the communities. Additional common vulnerability factors could include the experiences of defeat and shame, loneliness, and poor emotional regulation and coping skills.^{4,6} Data from various countries were consistent with the model. For example, an Irish study of boys and girls aged 15–17 years found that, for every boy who died by suicide, 16 sought hospital treatment for self-harm and 146 reported self-harm in the community, whilst for every girl who died by suicide, 162 sought hospital treatment for self-harm and 3296 reported self-harm.⁵ A recent meta-analysis of studies from China found a 15.4% prevalence rate for suicidal ideation compared to 3.5% for suicide attempts in children and adolescents below 18.⁷ A survey of 16–24-year-olds in England, 2014, reported 18.5–20.0% prevalence rates of common mental disorders, far surpassing the 4.9–7.9% self-reported suicide attempt rates.⁸ We proposed a comprehensive approach to investigating the trends and influencing factors of different “tiers” of the iceberg of youth suicidal behaviour, mental health problems, and vulnerability (Fig. 1).

First, the iceberg model can guide investigations into whether the rise in youth suicide was accompanied by an increase in suicidal behaviour, mental health problems, and vulnerability factors (Fig. 1, left column). Data

The Lancet Regional Health - Western Pacific 2024;49: 101151

Published Online xxx
<https://doi.org/10.1016/j.lanwpc.2024.101151>

*Corresponding author. Institute of Health Behaviors and Community Sciences, National Taiwan University, 17 Xuzhou Rd., Taipei, 100, Taiwan.

E-mail addresses: shusenchang@ntu.edu.tw (S.-S. Chang), jinvv06@gmail.com (Y.-T. Chang), laifchan@ppukm.ukm.edu.my (L.F. Chan), catriona.cordelia@gmail.com (Y.-Y. Chen), qcheng@cuhk.edu.hk (Q. Cheng), shimizu@jscp.or.jp (Y. Shimizu), nishina.yuka@jscp.or.jp (Y. Nishina), liangzhou_csu@vip.163.com (L. Zhou), sfpyip@hku.hk (P.S.F. Yip).

© 2024 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

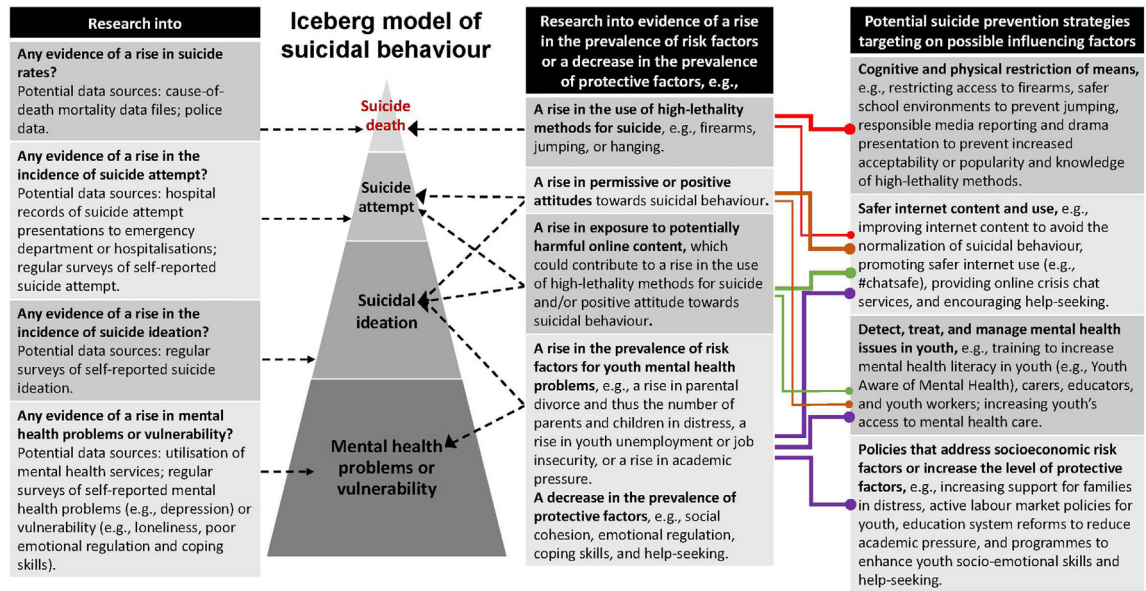


Fig. 1: The iceberg model of suicidal behavior to inform research into trends in youth suicidal behavior, mental health problems or vulnerability, as well as possible influencing factors, and potential prevention strategies targeting possible risk and protective factors.

from various sources, including vital statistics or police data (for suicide mortality), hospital records (for hospital-presenting suicide attempts and mental health problems), and surveys (for self-reported suicide attempts, suicide ideation, mental health problems, and vulnerability), can help discern trends and possible underlying reasons. For instance, a rise in suicides accompanied by a stable trend in suicide attempt would suggest a shift toward more lethal methods used in suicidal behaviours.

Second, the model can guide identifying risk and protective factors influencing trends in different tiers of the iceberg. For example, a rise in permissive attitudes toward suicide, if detected through repeated surveys, can be a factor underlying the rise in suicide ideation and attempts. A rise in the prevalence of other risk factors⁹ like parental divorce, youth unemployment, and academic pressure can increase youth vulnerability, mental health issues, and suicidal thoughts. Recent ideation-to-action models highlight the role of suicide capacity (dispositional, acquired, and practical) in explaining the transition from ideation to attempt¹⁰ and can guide the monitoring of factors influencing various forms of capacity (e.g., restricting access to suicide means would reduce the practical capacity).

Third, prevention strategies could be formulated by targeting the identified potential influencing factors (Fig. 1, right column). These might include: restricting access to or information about highly lethal means to prevent suicides from increased use of such means; promoting safer internet content or communication to

counter increasing permissive attitudes towards suicide; or increasing support services to a rising number of families experiencing divorce-related distress.

Youth suicide is multifaceted, necessitating a holistic understanding. Continuous monitoring and research of trends in youth suicidal behaviour, mental health issues, and vulnerability, as well as their influencing factors, informed by the iceberg model, can guide effective prevention efforts.

Contributors

Yi-Tzu Chang: conceptualisation, writing—original draft, and writing—review & editing; Shu-Sen Chang: conceptualisation, writing—original draft, and writing—review & editing; Lai Fong Chan, Ying-Yeh Chen, Qijin Cheng, Yasuyuki Shimizu, Yuka Nishina, Liang Zhou, Paul Siu Fai Yip: conceptualisation, writing—review & editing.

Declaration of interests

Y-TC and S-SC are supported by grants from Taiwan National Science and Technology Council (NSTC 112-2314-B-002-213-MY3). S-SC is supported by Ministry of Health and Welfare (M1202303) and Ministry of Education (113M316, 112M311), Taiwan. S-SC is affiliated with the Population Health and Welfare Research Center from the Featured Areas Research Center Program within the framework of the Higher Education SPROUT Project by the Ministry of Education (MOE), Taiwan (grant number NTU-113L900401). PSFY is supported by the Strategic Topic Grants Scheme (STG4/M-701/23-N) and a grant from the Hong Kong Research Grants Council General Research Fund (17606521).

References

- Bertuccio P, Amerio A, Grande E, et al. Global trends in youth suicide from 1990 to 2020: an analysis of data from the WHO mortality database. *eClinicalMedicine*. 2024;70:102506.
- Hong Kong Jockey Club Centre for Suicide Research and Prevention, The University of Hong Kong. Suicide rate by age group in Hong Kong. <https://csrp.hku.hk/statistics/>; 2024. Accessed June 8, 2024.

- 3 Chang YH, Lin CY, Liao SC, et al. Societal factors and psychological distress indicators associated with the recent rise in youth suicide in Taiwan: a time trend analysis. *Aust N Z J Psychiatry*. 2023;57(4):537–549.
- 4 Hawton K, Saunders KE, O'Connor RC. Self-harm and suicide in adolescents. *Lancet*. 2012;379(9834):2373–2382.
- 5 McMahon EM, Keeley H, Cannon M, et al. The iceberg of suicide and self-harm in Irish adolescents: a population-based study. *Soc Psychiatry Psychiatr Epidemiol*. 2014;49(12):1929–1935.
- 6 O'Connor RC, Nock MK. The psychology of suicidal behaviour. *Lancet Psychiatry*. 2014;1(1):73–85.
- 7 Chang Q, Shi Y, Yao S, Ban X, Cai Z. Prevalence of suicidal ideation, suicide plans, and suicide attempts among children and adolescents under 18 years of age in mainland China: a systematic review and meta-analysis. *Trauma Violence Abuse*. 2024;25(3):2090–2102.
- 8 McManus S, Gunnell D. Trends in mental health, non-suicidal self-harm and suicide attempts in 16-24-year old students and non-students in England, 2000-2014. *Soc Psychiatry Psychiatr Epidemiol*. 2020;55(1):125–128.
- 9 Morshidi MI, Chew PKH, Suarez L. Psychosocial risk factors of youth suicide in the Western Pacific: a scoping review. *Soc Psychiatry Psychiatr Epidemiol*. 2024;59(2):201–209.
- 10 Klonsky ED, May AM. The Three-Step Theory (3ST): a new theory of suicide rooted in the "Ideation-to-Action" framework. *Int J Cognit Ther*. 2015;8(2):114–129.