Title: The risk profile of young people admitted to hospital for suicidal behaviour in Melbourne, Australia

Brief title: Adolescents hospitalised for suicidal behaviour

Authors:

Rohan Borschmann PhD^{1,2,3,4}, Patrick Stark⁵, Chidambaram Prakash⁵, Susan M. Sawyer MBBS MD FRACP^{1,6,7}

1. Centre for Adolescent Health, Murdoch Children's Research Institute
2. Centre for Mental Health, Melbourne School of Population of Global Health; University of Melbourne, VIC
3. Department of Psychiatry; University of Melbourne
4. Health Service and Population Research Department; Institute of Psychiatry, Psychology & Neuroscience; King's College London, UK
5. Mental Health Services, Royal Children's Hospital, Melbourne, VIC
6. Department of Paediatrics, The University of Melbourne, VIC
7. Department of Adolescent Medicine, Royal Children's Hospital, Melbourne, VIC

Corresponding author:

Dr. Rohan Borschmann

Level 5, Murdoch Children's Research Institute

50 Flemington Road, Parkville 3052, AUSTRALIA

(e): rohan.borschmann@mcri.edu.au

(t): (+61) 410 903 337

Word count: 3127

Key words: Adolescent; suicidal behaviours; mental health; hospital admission

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: [10.1111/jpc.13938](https://doi.org/10.1111/jpc.13938)

ABSTRACT

Objective: Self-harm and suicidal behaviour is most prevalent during adolescence but little is known about the risk profile of adolescents admitted to hospital for suicidal behaviour. Young people who self-harm are at increased risk of mortality when compared to those who don't self-harm; adolescents admitted to hospital for suicidal behaviour are particularly at risk. The aim of this study was to generate a risk profile of adolescents admitted to hospital with suicidal behaviour. **Methods:** We conducted a 12-month retrospective audit of adolescent admissions to the mental health inpatient unit at a tertiary children's hospital in Melbourne, Australia. Routinely collected data was used to generate a risk profile. **Results:** We found that 212 of 271 (78.2%) admissions were due to suicidal behaviour. Of these, 107 (51%) adolescents were diagnosed with one or more mental disorders at discharge, most commonly Major Depressive Disorder. Beyond known distal determinants of health risk, the proximal risk profile of these adolescents included factors relating to gender, substance use, prior mental health diagnoses, and prior admission to hospital. Poor sleep was also a risk factor, with 159 (75%) reporting a recent history of sleeping problems. **Conclusion:** The very high proportion of admissions to the mental health inpatient unit due to suicidal behaviour reinforces the importance of finding effective methods of identification of the risk processes underpinning suicidal behaviours, to reduce the unnecessary waste of young lives by suicide.

What is already known on this topic:

- Self-harm is most prevalent during adolescence.
- Young people who self-harm are at increased risk of mortality compared with their non-self-harming peers.

- A range of individual, familial, social and environmental risk factors including poverty and entrenched social disadvantage contributes to suicidal behaviour in young people.

What this paper adds:

- An overwhelming majority of mental health admissions in adolescents (78.2%) are due to suicidal behaviour.
- Beyond known distal determinants of poor health and suicidal behaviour, the proximal risk profile of adolescents admitted to hospital due to suicidal behaviour includes factors relating to gender, substance use, prior mental health diagnoses, prior admission to hospital, and poor sleep.

INTRODUCTION

Suicide and self-harm in young people are major public health problems across the world (1, 2) and in Australia (3, 4). Suicide has recently overtaken maternal mortality as the leading cause of death for 15-19 year old females in South-East Asia (5) and accounted for more than 20% of all deaths in 15-19 year old males in Australia in 2012 (3). Self-harm, which is particularly common among adolescents (6-10), is one of the strongest predictors of subsequent suicide (11, 12). Adolescents who self-harm are also at significantly increased risk of early death from a range of other causes (13, 14). For a great majority, self-harm appears to be a transitory phenomenon, with prevalence rates declining sharply by the end of the teenage years (10, 15). However recent evidence from longitudinal cohort studies of the general population shows that self-harm during adolescence is independently associated with mental and substance use disorders in early adulthood (9, 16).

Suicidal behaviour, including self-harm with a non-fatal outcome, includes a spectrum of thoughts and behaviours from suicidal ideation, through to active planning, and attempts to die from suicide. The timing and degree of intervention by health professionals varies according to where an individual adolescent lies on this spectrum and of the persistence of distress; those further along typically require more immediate attention, while those with persistent ideation require more intensive interventions to prevent them progressing along the spectrum. Identifying risk factors can help inform candidate interventions to reduce the incidence of suicide and self-harm in both clinical samples and potentially more broadly in young people, maximising the chances of achieving the goal of 'zero suicide deaths in care' (17, 18) in a population at markedly increased risk.

Previous research (19) has divided risk factors for suicidal behaviour in adolescence into the following four categories:

1. **Individual level factors** e.g. gender, genetic traits (personality traits, cognitive styles), mental health, previous suicidal behaviour, alcohol or substance abuse.
2. **Familial factors** e.g. family history of suicide, trauma, or mental illness, as well as whether the family is intact.
3. **Life stressors** e.g. death of a parent, family breakdown, physical or sexual abuse, bullying.
4. **Social-environmental and demographic factors** e.g. lower socio-economic status, rural locality.

Beyond these factors, it is well established that sleep disturbance is a risk factor for the development of depression (20), and that depression is a risk factor for suicide in adolescents (21-23). However, few studies have specifically identified sleep disturbance as an independent risk factor for suicidal behaviour (24).

A small number of previous studies have attempted to document the profile of children and adolescents admitted to inpatient mental health units due to suicidal behaviour (23, 25-30). Whilst several of these have examined the patients' age, gender and primary diagnoses, few have examined the presence of established risk factors (see Table 1). Most have involved relatively small sample sizes (ranging from 28-150) or have lacked methodological rigour, and only one (26) was conducted in Australia. The aim of this study was to generate a risk profile of adolescents admitted to the mental health unit at the Royal Children's Hospital (RCH) in Melbourne, Australia over a 12-month period with the goal of contributing to greater understanding of suicidal behaviour in this vulnerable population.

[Insert Table 1 here]

METHOD

Health care in Australia

Public health care in Australia is available to all and is usually free of charge at the point of service. In some cases, such as general practitioner (GP) and specialist appointments, patients may incur a 'medical gap' expense, an out-of-pocket payment reflecting the difference between the total fee charged by the GP and any applicable Medicare rebate (plus health fund benefit). In the state of Victoria, child and adolescent mental health services (until the age of 18 years for all children, and until 24 years in some services) comprise both outpatient and inpatient services. Outpatient services are primarily provided by Child and Adolescent Mental Health Services (CAMHS). This is in addition to general practice, private mental health services, school-based support services and Headspace, which provides free (or low cost) early intervention mental health services to 12-25 year olds. Inpatient mental health services are reserved for adolescents who are at the most acute risk to themselves or others due to their mental health issues.

Setting

The mental health inpatient unit at the Royal Children's Hospital (RCH) in Melbourne is a 16-bed facility within the main hospital where young people aged 12 to 18 years are assessed and treated for a range of mental and psychological disorders (see Panel 1).

[Insert Panel 1 here]

Study design, participants and ethical approval

This study was an audit of consecutive admissions to the mental health inpatient unit at the RCH in Melbourne for the 12-month period between 1 October 2013 and 30 September 2014. Ethical approval was obtained from the Human Research Ethics Committee at the RCH prior to beginning the study.

Measures

Data relating to the above risk factors were obtained from the routine assessment forms that are completed by mental health clinicians at the time of admission to the unit and at discharge, as well as from the scanned electronic medical record system at the RCH (which at that time included copies of all paperwork completed during the admission process, hospital stay and subsequent discharge). The presence of suicidal behaviour was determined by clinicians based on the clinical history, subsequent case notes and patient accounts during clinical interview. Data were also collected in relation to patient age and gender, number and length of previous admissions to the RCH (and elsewhere), history of mental illness or substance use, prior sleeping problems, history of physical or sexual abuse (disclosed as well as suspected), history of bullying, history of significant trauma (e.g. witnessing parental drug overdose, parental incarceration, domestic violence, or family being held in detention as refugees after fleeing oppression), family composition and family history of mental health diagnoses.

Data analysis

Data were anonymised and entered into the statistical software package SPSS (31) for analysis. Descriptive statistics were generated to describe the profile of admitted patients. As there was no comparison group, data were compared with published reports and, where available, national Australian population data for adolescent behaviours.

RESULTS

There were 427 admissions to the RCH mental health unit during the 12-month data collection period, involving 271 different individuals. Of these 271, a total of 212 (78.2%) were admitted due to suicidal behaviours. The demographic and clinical characteristics of these 212 patients are presented in Table 2.

[Insert Table 2 here]

The mean age of adolescents admitted due to suicidal behaviour was 15.4 years (range, 12-17). Most participants were admitted on one occasion only, with the number of admissions ranging up to 10 over the 12 months of the audit. More than one-quarter of participants (25.5%) had been admitted to the RCH (for any reason) prior to the age of ten years. The mean duration of admission was 9.2 days (median, 6; range, 1-59). Upon discharge, an overwhelming majority of participants (86.3%) were referred to a Child and Adolescent Mental Health Service (CAMHS) for follow-up care.

Individual level risk factors: Most participants reported one or more individual level risk factors. More than three-quarters had one or more mental disorders diagnosed at discharge, with the most common diagnoses being Major Depressive Disorder, situational crisis, and dysthymia, which collectively accounted for more than two-thirds of admissions. Exactly three quarters (75.0%) reported sleeping difficulties prior to admission.

Familial factors: Approximately two-thirds of participants reported one or more familial level risk factors. A total of 65.6% of participants reported that their parents were no longer together and more than half (52.8%) reported a history of significant family trauma.

Life stressors: More than three in five participants reported one or more of the life stressors identified in previous research. Lifetime victimisation by bullying was reported by three-fifths (60.4%) of participants. More than one-quarter reported lifetime victimisation by sexual abuse (26.9%) and more than one-fifth (22.2%) reported having been abused physically.

Social-environmental and demographic factors: Most participants reported one or more demographic or social-environmental level risk factors. More than three-quarters (78.8%) were female.

DISCUSSION

The aim of this study was to generate a risk profile of adolescents admitted to the mental health unit at the Royal Children's Hospital (RCH) in Melbourne, Australia over a 12-month period. Our findings demonstrate that almost 4 in 5 (78%) admissions were due to the presence of suicidal behaviour. The sample size of 212 young people was considerably larger than most previous studies examining this issue (23, 25-30), and a much wider range of covariates was explored. Our range of measurements was also more comprehensive than the only other comparable Australian data published to date (26). Within our cohort, risk factors associated with admissions due to suicidal behaviour included gender, substance use, a prior mental health diagnosis, and admission to hospital before the age of ten years. Poor sleep was also commonly reported, which supports previous research demonstrating that poor sleep and experiences of nightmares have both been linked to suicidal intent in adolescents admitted to inpatient mental health units (32).

The gender ratio of participants in the current study was consistent with previous studies that demonstrate the predominance of females (23, 25, 28-30). In our sample, 1.9% of admitted adolescents identified as transgender, which was slightly higher than the 1.2% of high school students reported in a New Zealand population study by Clark et al. (33). Our

findings add weight to recent research which has identified an association between transgender young people and suicidal behaviour (34, 35).

Lifetime bullying victimisation was reported by three in five adolescents in our sample, which is higher than the prevalence of bullying in the general adolescent population in Australia (36). Bullying is a common problem during adolescence (37, 38), and a recent prospective study of a nationally representative UK cohort of adolescents reported a strong association between bullying victimization and self-harm, even after IQ, pre-morbid emotional and behavioural problems, and family environmental risks were taken into account (39). Bullying has also been linked with suicide attempts in adolescents admitted to inpatient mental health units (29).

Major Depressive Disorder (MDD) was the most common primary discharge diagnosis in our sample, followed by situational crisis, and then dysthymia. Collectively, these three diagnoses accounted for more than two-thirds of admissions for suicidal behaviour. In the general adolescent population in Australia, MDD is the third most common mental health disorder, behind Attention Deficit and Hyperactivity Disorder (ADHD) and anxiety disorders (40). Depression has previously been linked to both suicide attempts (21-23) and self-harm (41) in adolescents seeking treatment for mental health problems.

One quarter (26%) of participants in our study had been admitted to the RCH on one or more occasions prior to their eleventh birthday. As the RCH does not admit children for mental health-related reasons until the age of 12, it is likely that these were physical illness or injury-related admissions. As such, it is possible that participants in our study experienced elevated levels of medical comorbidity that served as a risk factor for subsequent mental disorder during adolescence. Along with the lack of an intact family, bullying victimisation and a history of family trauma - each of which was reported by more than half of our participants - a history of serious childhood illness or injury during childhood has been recognised as an adverse childhood experience (ACE) (42). A 2017 systematic review and meta-analysis examining the impact of multiple ACEs demonstrated that children who

experienced four or more ACEs were at seven-fold increased risk of engaging in self-harm (42) than those who did not experience any ACEs. Our findings support those of this recent review.

Three quarters (75%) of participants reported difficulties with sleep, a figure that is markedly higher than the 23% of high school students who reported sleep difficulties in a recent Australian study (43). Within the mental health unit, sleep is assessed in detail (i.e. both the amount and quality of sleep are assessed), and health education about sleep hygiene is routinely provided to all young people during admission. In cases where sleep is inadequate or insufficient, melatonin is commonly prescribed with zopiclone less commonly prescribed. Prazosin is administered in the context of nightmares which are thought to be largely trauma-related. Previous research has identified a strong association between poor sleep (including nightmares (32)) and suicidal behaviour (22, 24, 44), and our findings, although based on cross-sectional data without any indication of severity of sleep disturbance, also suggest that poor sleep may be associated with suicidal behaviour in adolescents. Future research should seek to further examine whether poor sleep is an independent predictor of suicidal behaviour in adolescents.

Family and social factors play an intricate role in suicidal behaviours in young people (45, 46). These can include whether the family is intact and the presence of a family history of mental illness and/or trauma. Approximately one third of admitted adolescents in our study were from intact families, which is comparable to previous Australian research (26) and considerably lower than that observed in the general adolescent population (47). A family history of mental illness was reported by 74% of participants, which was similar to the 69% reported by De Kloet et al. (26) in the one previous Australian study. Life stressors such as a history of physical or sexual abuse (48-50) increase the risk of both suicidal behaviours and self-harm (51). In our study, 33% of admitted adolescents had disclosed or suspected sexual abuse, and 34% had disclosed or suspected physical abuse. These findings are consistent with previous studies (26, 29), and demonstrate the importance of preventing abuse. They

also reinforce the importance of identifying families likely to benefit from enhanced social support and early intervention.

The average length of stay in this study was 9.2 days, which was almost twice as long as the average length of stay for medical patients at the RCH during the same period (4.9 days) (52). Despite this, the average length of stay in our study was less than that reported by De Kloet et al. (26) in their study of adolescents admitted to hospital due to self-harm in New South Wales, Australia. This may reflect a different threshold of risk in different States, which of itself might reflect access to community based services that are able to manage a higher level of risk. This relatively short length of stay is consistent with the philosophy of care, as demonstrated in Panel 1, which aims to provide containment for this high-risk cohort, provide a recovery-orientated model of care and focus on building motivation for engagement with community based services. Our findings contribute to understanding the profile of adolescents admitted to mental health inpatient units due to suicidal behaviours. Although the bulk of evidence relating to interventions to reduce suicide attempts and self-harm in adolescents comes from trials involving outpatients (53), identifying those adolescents likely to benefit from such interventions is a vital step towards reducing such behaviours in this vulnerable population. We acknowledge that identifying those at greatest risk is a considerable challenge; a recent meta-analysis reported low positive predictive values (26%) of risk scales for self-harm (54). Self-poisoning has been identified as a risk factor for premature mortality (including death due to suicide) in both Australia (55) and the UK (56), with this risk remaining present for at least ten years. In light of this, initiating appropriate follow-up care and interventions for this highly vulnerable population should be considered a clinical priority of utmost urgency.

The Royal Children's Hospital manages young people up until the age of at least 19 years, which spans the age of peak incidence of mental disorder. Like most other hospitals in Australia and beyond, we have experienced a substantial increase in presentations to the emergency department of adolescents with suicidal behaviour. In collaboration with the

mental health service, the Royal Children's Hospital emergency department has responded by developing a mental health model of care that has greatly increased its capacity to assess and initiate mental health care for vulnerable adolescents, including those presenting with self-harm. Currently, this model is almost available around the clock (i.e., 6 days a week of 24-hour access). Without this approach, we would no doubt have experienced even more admissions with suicide behaviours.

The strengths of this study include the large sample size, the systematic inclusion of all admissions for suicidal behavior during the specified period, and our examination of a wider range of risk factors than included in previous studies (23, 25-30). Our findings are the first from the state of Victoria and add to the only existing published study profiling adolescents admitted to mental health inpatient wards due to suicidal behaviour in Australia (26). These findings must also be considered in light of some limitations. First, we used a retrospective audit methodology. This means our data are cross-sectional in nature and, as such, no direction of causality can be attributed to associations between the demographic and clinical factors explored (e.g. substance misuse). A second limitation of this method is that data were collected from routine information collected at the time of admission and discharge from each patient's medical record. Thus, while specific data were routinely collected, the study relies on the quality of clinical assessment rather than standardized screening or diagnostic measures. There is therefore some lack of uniformity in how data were recorded. This was apparent in relation to the lack of data relating to participants' sexual orientation, which in light of the elevated rates of suicide and self-harm in lesbian, gay, and bisexual populations (50, 57, 58), would also be relevant. It was also apparent in relation to socio-economic risk factors for suicidal behavior, such as poverty which, as expected, are poorly assessed using this approach. Third, as we did not have a control group with which to compare our findings, we relied on appropriate population studies for comparison.

Conclusions

This study extends knowledge by generating a risk profile of adolescents admitted to the mental health inpatient unit of a tertiary clinical service over a 12-month period. It adds to the weight of evidence regarding established risk factors for suicidal behaviour during adolescence, and raises questions about the possible contribution of other risk factors for suicidal behavior, such as poor sleep. The very high proportion of admissions to the mental health inpatient unit accounted for by suicidal behaviours reinforces the importance of finding effective methods of identification of the risk processes underpinning suicidal behaviours in order to reduce the unnecessary waste of young lives by suicide. As this cohort of adolescents is at markedly increased risk of suicide, greater understanding of these processes will help lay the foundation for effective interventions that are required in treatment settings to achieve the optimal goal of 'zero suicide deaths in care' (17, 18).

References

1. Wang H, Naghavi M, Allen C, Barber RM, Bhutta ZA, Carter A, et al. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016;388(10053):1459-544.
2. Kassebaum NJ, Arora M, Barber RM, Bhutta ZA, Brown J, Carter A, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016;388(10053):1603-58.
3. ABS. Australian Bureau of Statistics, Causes of Death, Australia, 2012, Catalogue Number 3303.0 (2014). At

<http://www.abs.gov.au/ausstats/abs@.nsf/detailspage/3303.02012?opendocument>

(viewed 11 April 2014). 2012.

4. AIHW. Australian Institute of Health and Welfare. 2016; Australian Hospital Statistics 2014-15. <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129554729> 2016.
5. WHO. World Health Organization. Health for the World's Adolescents. A second chance in the second decade. http://www.who.int/maternal_child_adolescent/documents/second-decade/en/. 2015.
6. Hawton K, Rodham K, Evans E, Weatherall R. Deliberate self harm in adolescents: self report survey in schools in England. *BMJ*. 2002;325:1207-11.
7. Plener PL, Libal G, Keller F, Fegert JM, Muehlenkamp JJ. An international comparison of adolescent nonsuicidal self-injury (NSSI) and suicide attempts: Germany and the USA. *Psychological Medicine*. 2009;39:1549-58.
8. Lloyd-Richardson EE, Perrine N, Dierker L, Kelley ML. Characteristics and functions of nonsuicidal self-injury in a community sample of adolescents. *Psychological Medicine*. 2007;37:1183-92.
9. Mars B, Heron J, Crane C, Hawton K, Lewis G, Macleod J, et al. Clinical and social outcomes of adolescent self harm: population based birth cohort study. *BMJ*. 2014;349:g5954.
10. Moran P, Coffey C, Romaniuk H, Olsson C, Borschmann R, Carlin JB, et al. The natural history of self-harm during adolescence and young adulthood: population-based cohort study. *The Lancet*. 2012;379(9812):236-43.

11. Bergen H, Hawton K, Waters K, Ness J, Cooper J, Steeg S, et al. Premature death after self-harm: a multicentre cohort study. *Lancet*. 2012;DOI:10.1016/S0140-6736(12)61141-6.
12. Cooper J, Kapur N, Webb R, Lawlor M, Guthrie E, Mackway-Jones K, et al. Suicide after deliberate self-harm: a 4-year cohort study. *American Journal of Psychiatry*. 2005;162:297-303.
13. Hawton K, Harriss L. Deliberate self-harm in young people: characteristics and subsequent mortality in a 20-year cohort of patients presenting to hospital. *Journal of Clinical Psychiatry*. 2007;68:1574-83.
14. Hawton K, Harriss L, Zahl D. Deaths from all causes in a long-term follow-up study of 11583 deliberate self-harm patients. *Psychological Medicine*. 2006;36(3):397-405.
15. Klonsky ED, Oltmanns TF, Turkheimer E. Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *American Journal of Psychiatry*. 2003;160(8):1501-8.
16. Moran P, Coffey C, Romaniuk H, Degenhardt L, Borschmann R, Patton G. Substance use in adulthood following adolescent self-harm: a population-based cohort study. *Acta Psychiatrica Scandinavica*. 2015;131(1):61-8.
17. Commission NMH. The national review of mental health programmes and services. Sydney: NMHC. 2014.
18. O'connor E, Gaynes BN, Burda BU, Soh C, Whitlock EP. Screening for and treatment of suicide risk relevant to primary care: a systematic review for the US Preventive Services Task Force. *Annals of internal medicine*. 2013;158(10):741-54.

19. Waldvogel JL, Rueter M, Oberg CN. Adolescent suicide: risk factors and prevention strategies. *Current problems in pediatric and adolescent health care*. 2008;38(4):110-25.
20. Mallon L, Broman J-E, Hetta J. Relationship between insomnia, depression, and mortality: a 12-year follow-up of older adults in the community. *International Psychogeriatrics*. 2000;12(03):295-306.
21. Harrington R. Depression, suicide and deliberate self-harm in adolescence. *British Medical Bulletin*. 2001;57(1):47-60.
22. Gasquet I, Choquet M. Hospitalization in a pediatric ward of adolescent suicide attempters admitted to general hospitals. *Journal of adolescent health*. 1994;15(5):416-22.
23. Chiou P-N, Chen Y-S, Lee Y-C. Characteristics of adolescent suicide attempters admitted to an acute psychiatric ward in Taiwan. *Journal of the Chinese Medical Association*. 2006;69(9):428-35.
24. Sabo E, Reynolds CF, Kupfer DJ, Berman SR. Sleep, depression, and suicide. *Psychiatry research*. 1991;36(3):265-77.
25. Consoli A, Cohen D, Bodeau N, Guilé J-M, Mirkovic B, Knafo A, et al. Risk and protective factors for suicidality at 6-month follow-up in adolescent inpatients who attempted suicide: an exploratory model. *Canadian journal of psychiatry Revue canadienne de psychiatrie*. 2015;60(2 Suppl 1):S27.
26. de Kloet L, Starling J, Hainsworth C, Berntsen E, Chapman L, Hancock K. Risk factors for self-harm in children and adolescents admitted to a mental health inpatient unit. *Australian and New Zealand journal of psychiatry*. 2011;45(9):749-55.

27. Fischer G, Ameis N, Parzer P, Plener PL, Groschwitz R, Vonderlin E, et al. The German version of the self-injurious thoughts and behaviors interview (SITBI-G): a tool to assess non-suicidal self-injury and suicidal behavior disorder. *BMC psychiatry*. 2014;14(1):265.
28. Gallagher M, Prinstein MJ, Simon V, Spirito A. Social anxiety symptoms and suicidal ideation in a clinical sample of early adolescents: Examining loneliness and social support as longitudinal mediators. *Journal of abnormal child psychology*. 2014;42(6):871-83.
29. Luukkonen A-H, Räsänen P, Hakko H, Riala K. Bullying behavior is related to suicide attempts but not to self-mutilation among psychiatric inpatient adolescents. *Psychopathology*. 2009;42(2):131-8.
30. Wolff J, Frazier EA, Esposito-Smythers C, Burke T, Sloan E, Spirito A. Cognitive and social factors associated with NSSI and suicide attempts in psychiatrically hospitalized adolescents. *Journal of abnormal child psychology*. 2013;41(6):1005-13.
31. SPSS-Inc. SPSS for Windows (v.20). Chicago: SPSS; 2012.
32. Kaplan SG, Ali SK, Simpson B, Britt V, McCall WV. Associations between sleep disturbance and suicidal ideation in adolescents admitted to an inpatient psychiatric unit. *International journal of adolescent medicine and health*. 2014;26(3):411-6.
33. Clark TC, Lucassen MF, Bullen P, Denny SJ, Fleming TM, Robinson EM, et al. The health and well-being of transgender high school students: results from the New Zealand adolescent health survey (Youth'12). *Journal of Adolescent Health*. 2014;55(1):93-9.

34. Mustanski B, Liu RT. A longitudinal study of predictors of suicide attempts among lesbian, gay, bisexual, and transgender youth. *Archives of sexual behavior*. 2013;42(3):437-48.
35. Gibbs JJ, Goldbach J. Religious conflict, sexual identity, and suicidal behaviors among LGBT young adults. *Archives of suicide research*. 2015;19(4):472-88.
36. Cross D, Shaw T, Hearn L, Epstein M, Monks H, Lester L, et al. Australian covert bullying prevalence study. 2009.
37. Analitis F, Velderman MK, Ravens-Sieberer U, Detmar S, Erhart M, Herdman M, et al. Being bullied: associated factors in children and adolescents 8 to 18 years old in 11 European countries. *Pediatrics*. 2009;123(2):569-77.
38. McMahon EM, Reulbach U, Keeley H, Perry IJ, Arensman E. Bullying victimisation, self harm and associated factors in Irish adolescent boys. *Social Science and Medicine*. 2010;71:1300-7.
39. Fisher HL, Moffitt TE, Houts RM, Belsky DW, Arseneault L, Caspi A. Bullying victimisation and risk of self harm in early adolescence: longitudinal cohort study. *BMJ*. 2012;344:e2683.
40. Lawrence D, Johnson S, Hafekost J, de Haan KB, Sawyer M, Ainley J, et al. The mental health of children and adolescents: Report on the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. 2015.

41. Baiden P, Stewart SL, Fallon B. The role of adverse childhood experiences as determinants of non-suicidal self-injury among children and adolescents referred to community and inpatient mental health settings. *Child Abuse & Neglect*. 2017;69:163-76.
42. Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *The Lancet Public Health*. 2017;2(8):e356-e66.
43. Short MA, Gradisar M, Gill J, Camfferman D. Identifying adolescent sleep problems. *PloS one*. 2013;8(9):e75301.
44. Turvey CL, Conwell Y, Jones MP, Phillips C, Simonsick E, Pearson JL, et al. Risk factors for late-life suicide: a prospective, community-based study. *The American Journal of Geriatric Psychiatry*. 2002;10(4):398-406.
45. Gratz KL, Conrad SD, Roemer L. Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry*. 2002;72(1):128.
46. Hawton K, Saunders KE, O'Connor RC. Self-harm and suicide in adolescents. *The Lancet*. 2012;379(9834):2373-82.
47. ABS. Australian Bureau of Statistics, Family Characteristics and Transitions, Australia, 2012-13, Catalogue Number 4442.0 (2015). At 2015.
48. Paris J. Psychological risk factors for borderline personality disorder in female patients. *Comprehensive Psychiatry*. 1994;35:301-5.

49. Zanarini MC, Frankenburg FR, Reich DB, Marino MF, Lewis RE, Williams AA, et al. Biparental failure in the childhood experiences of borderline patients. *Journal of Personality Disorders*. 2000;14:264-73.
50. Skegg K. Self-harm. *The Lancet*. 2005;366:1471-83.
51. Liu RT, Frazier EA, Cataldo AM, Simon VA, Spirito A, Prinstein MJ. Negative life events and non-suicidal self-injury in an adolescent inpatient sample. *Archives of Suicide Research*. 2014;18(3):251-8.
52. Stratford T. Personal communication: Tony Stratford, Royal Children's Hospital Health Information Technology Department. 2015.
53. Ougrin D, Tranah T, Stahl D, Moran P, Asarnow JR. Therapeutic interventions for suicide attempts and self-harm in adolescents: systematic review and meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2015;54(2):97-107. e2.
54. Carter G, Milner A, McGill K, Pirkis J, Kapur N, Spittal MJ. Predicting suicidal behaviours using clinical instruments: systematic review and meta-analysis of positive predictive values for risk scales. *The British Journal of Psychiatry*. 2017:bjp. bp. 116.182717.
55. Reith DM, Whyte I, Carter G, McPherson M, Carter N. Risk factors for suicide and other deaths following hospital treated self-poisoning in Australia. *Australian and New Zealand Journal of Psychiatry*. 2004;38(7):520-5.
56. Herbert A, Gilbert R, Cottrell D, Li L. Causes of death up to 10 years after admissions to hospitals for self-inflicted, drug-related or alcohol-related, or violent injury during adolescence: a retrospective, nationwide, cohort study. *The Lancet*. 2017.

57. Deliberto TL, Nock MK. An exploratory study of correlates, onset, and offset of non-suicidal self-injury. *Archives of Suicide Research*. 2008;12(3):219-31.
58. King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D, et al. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry*. 2008;8(1):70.

Table 1: Published profiles of adolescents admitted to hospital due to suicidal behaviours.

	Consoli et al. (2015) (1)	Gallagher et al. (2014) (2)	Fischer et al. (2014) (3)	Wolff et al. (2013) (4)	Pettit et al. (2011) (5)	De Kloet et al. (2011) (6)	Luukkonen et al. (2009) (7)
Country	France	USA	Germany	USA	USA	Australia	Finland
Sample size	100	144	111	79	131	150	104
Mean age (years)	14.9	13.5	15.4	15.1	15.0	14.0	15.7
Gender (% female)	84%	72%	55%	89%	70	73%	75%
Length of admission (days)	No data	No data	No data	No data	No data	19	No data
Primary diagnosis	BPD 67% MDD 64%	MDD 31% ODD 25% CD 17%	MDD 53% Stress 21%	MDD 65% SP 71% ADHD 38%	AD 38% CD/ODD 27% MDD 23% SU 20%	MDD 60% AD 34% PTSD 26%	Boys: AFD 62% CD 50% SU 39% Girls: AFD 76% AD 47% SU 41%
Family intact	48%	27%	No Data	No Data	No data	42%	Boys: 27% Girls: 33%
Family history of mental illness	No Data	No Data	No Data	No Data	No data	69%	No Data
Previous family trauma	No Data	No Data	No Data	No Data	1%	91%	No Data
Previous physical abuse	No Data	No Data	No Data	No Data	No data	25.7%	Boys: 15% Girls: 27%

Previous sexual abuse	No Data	No Data	No data	No Data	No data	31%	Boys: 4% Girls: 33%
Previous bullying victimisation	No Data	No Data	No Data	No Data	No data	39%	Boys: 29% Girls: 47%
Alcohol use	No Data	No Data	No Data	14%	No data	No Data	No Data
Substance use	No Data	No Data	No Data	16%	20%	No Data	No Data
Sleeping problems	No Data	No Data	No Data	No Data	No data	No Data	No Data

AD = anxiety disorder, ADHD = attention deficit hyperactivity disorder, BPAD = bipolar affective disorder, BPD = borderline personality disorder, CD = conduct disorder, SH = self-harm, MDD = major depressive disorder, PTSD = post-traumatic stress disorder, MD = mood disorder, Dysth = dysthymia, SB = suicidal behaviour, SZ = schizophrenia, SU = illicit substance use.

Table 1 (continued): Published profiles of adolescents admitted to hospital due to suicidal behaviours.

	Chiou et al. (2006) (8)	Goldston et al. (1998) (9)	King et al. (1993) (10)
Country	Taiwan	USA	USA
Sample size	28	269	54
Mean age (years)	16.3	15.0	15.4
Gender (% female)	75%	51	100
Length of admission (days)	No data	No data	No data
Primary diagnosis	MDD 50% SZ 14% Bipolar 14%	Not disaggregated	MDD 56% Dysth 20% SU 20% AD 19% BPAD 17%
Family intact	58%	No data	No data
Family history of mental illness	No Data	No data	No data
Previous family trauma	No Data	No data	No data
Previous physical abuse	14.4%	No data	No data
Previous sexual abuse	No Data	No data	No data
Previous bullying victimisation	No Data	No data	No data
Alcohol use	No Data	Not disaggregated	59%

Substance use	18%	Not disaggregated	No data
Sleeping problems	No Data	No data	No data

AD = anxiety disorder, ADHD = attention deficit hyperactivity disorder, BPAD = bipolar affective disorder, BPD = borderline personality disorder, CD = conduct disorder, SH = self-harm, MDD = major depressive disorder, PTSD = post-traumatic stress disorder, MD = mood disorder, Dysth = dysthymia, SB = suicidal behaviour, SZ = schizophrenia, SU = illicit substance use.

Panel 1.

The mental health inpatient unit at the Royal Children's Hospital (RCH) in Melbourne is a 16-bed facility where 12-18 year-old adolescents are assessed and treated for a range of severe mental and psychological disorders. It is the inpatient unit for the region's Child and Adolescent Mental Health Service (CAMHS) and is representative of other CAMHS units in Victoria. The majority of admissions are referred from the adjoining RCH Emergency Department, though young people may also be referred directly from outpatient mental health services if assessment affirms them to be at such acute psychiatric risk that inpatient mental health care is required. In Victoria, CAMHS inpatient units are part of a network of community-based services. These include Intensive Mobile Youth Outreach Services and Crisis Assessment/Youth Assessment Teams which provide an additional layer of acute care for highly vulnerable adolescents.

The philosophy of the mental health unit is to offer the least restrictive environment for patients with acute psychiatric risk. The unit aims to provide containment (safety) while building motivation for engagement with community based services which are conceptualised as the setting for therapeutic work. The unit provides a recovery-oriented model of practice that aims to address both the internal characteristics commonly experienced within recovery (e.g., hope, healing, empowerment and connection) as well as the external features that facilitate recovery (e.g., a positive culture of healing, access to quality health services, ensuring basic needs are met, and attending to human rights) (11). While psychotherapeutic medication is commonly used, it is with the intention of facilitating ongoing care in the community. The majority of patients are not on treatment orders.

Table 2. Demographic and clinical characteristics of adolescents admitted to hospital for suicidal behaviour (n=212).

		N (n=212)	%
Gender	Female	167	78.8
	Male	41	19.3
	Transgender	3	1.3
Age	Mean (SD) age in years	15.4	1.3
Admission history	Previous admission to RCH aged ≤ 10	54	25.5
	Admitted once during data collection period	135	63.7
	Admitted ≥ 2 times during data collection period	77	36.3
Personal risk factors	Sleeping difficulties	159	75.0
	Alcohol consumption	74	34.9
	Illicit substance use	73	34.4
Familial risk factors	Family not intact	139	65.6
	Family history of mental illness	156	73.6
	History of family trauma	112	52.8
Life stressors	History of bullying	128	60.4
	History of sexual abuse ¹	57	26.9
	History of physical abuse ²	47	22.2
Duration of admission	Mean (SD) number of days	9.2	9.2
Diagnosis at discharge	Major depressive disorder (MDD)	107	50.5
	Situational crisis	31	14.6
	Dysthymia	13	6.1
	Acute stress reaction	12	5.7
	Post-traumatic stress disorder (PTSD)	9	4.2
	Anxiety	9	4.2
	Other ³	31	14.6
Follow-up referral source	Child and Adolescent Mental Health Service (CAMHS)	144	86.3
	Youth Access Team (YAT)	24	11.3
	Private psychiatrist	23	10.8
	Other	21	9.9

¹ Confirmed cases; suspected in another 12 (5.7%) cases;

² Confirmed cases; suspected in another 25 (11.8%) cases;

³ Other diagnoses included borderline personality disorder, drug dependence, and psychosis.

References

1. Consoli A, Cohen D, Bodeau N, Guilé J-M, Mirkovic B, Knafo A, et al. Risk and protective factors for suicidality at 6-month follow-up in adolescent inpatients who attempted suicide: an exploratory model. *Canadian journal of psychiatry Revue canadienne de psychiatrie*. 2015;60(2 Suppl 1):S27.
2. Gallagher M, Prinstein MJ, Simon V, Spirito A. Social anxiety symptoms and suicidal ideation in a clinical sample of early adolescents: Examining loneliness and social support as longitudinal mediators. *Journal of abnormal child psychology*. 2014;42(6):871-83.
3. Fischer G, Ameis N, Parzer P, Plener PL, Groschwitz R, Vonderlin E, et al. The German version of the self-injurious thoughts and behaviors interview (SITBI-G): a tool to assess non-suicidal self-injury and suicidal behavior disorder. *BMC psychiatry*. 2014;14(1):265.
4. Wolff J, Frazier EA, Esposito-Smythers C, Burke T, Sloan E, Spirito A. Cognitive and social factors associated with NSSI and suicide attempts in psychiatrically hospitalized adolescents. *Journal of abnormal child psychology*. 2013;41(6):1005-13.
5. Pettit JW, Green KL, Grover KE, Schatte DJ, Morgan ST. Domains of chronic stress and suicidal behaviors among inpatient adolescents. *Journal of Clinical Child & Adolescent Psychology*. 2011;40(3):494-9.
6. de Kloet L, Starling J, Hainsworth C, Berntsen E, Chapman L, Hancock K. Risk factors for self-harm in children and adolescents admitted to a mental health inpatient unit. *Australian and New Zealand journal of psychiatry*. 2011;45(9):749-55.
7. Luukkonen A-H, Räsänen P, Hakko H, Riala K. Bullying behavior is related to suicide attempts but not to self-mutilation among psychiatric inpatient adolescents. *Psychopathology*. 2009;42(2):131-8.
8. Chiou P-N, Chen Y-S, Lee Y-C. Characteristics of adolescent suicide attempters admitted to an acute psychiatric ward in Taiwan. *Journal of the Chinese Medical Association*. 2006;69(9):428-35.
9. Goldston DB, Daniel SS, Reboussin BA, Reboussin DM, Kelley AE, Frazier PH. Psychiatric diagnoses of previous suicide attempters, first-time attempters, and repeat attempters on an adolescent inpatient psychiatry unit. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1998;37(9):924-32.
10. King CA, Hill EM, Naylor M, Evans T, Shain B. Alcohol consumption in relation to other predictors of suicidality among adolescent inpatient girls. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1993;32(1):82-8.
11. Jacobson N, Greenley D. What is recovery? A conceptual model and explication. *Psychiatric Services*. 2001;Apr;52(4):482-5.

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Borschmann, R;Stark, P;Prakash, C;Sawyer, SM

Title:

Risk profile of young people admitted to hospital for suicidal behaviour in Melbourne, Australia

Date:

2018-11-01

Citation:

Borschmann, R., Stark, P., Prakash, C. & Sawyer, S. M. (2018). Risk profile of young people admitted to hospital for suicidal behaviour in Melbourne, Australia. JOURNAL OF PAEDIATRICS AND CHILD HEALTH, 54 (11), pp.1213-1220. <https://doi.org/10.1111/jpc.13938>.

Persistent Link:

<http://hdl.handle.net/11343/283999>