

# Self-injury in Australia: a community survey

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Self-injury is deliberate damage to the body without suicidal intent. Given the young age of onset for most self-injurers, community-based studies have focused on adolescents<sup>1,2</sup> or university students.<sup>3,4</sup> However, most studies for all ages focus not on community samples but on clinical cases in emergency departments<sup>5,6</sup> or inpatient units.<sup>7-9</sup> To date, there has been only one previous nationally representative study of adult self-injury, conducted in the United States.<sup>10</sup>

A key clinical issue is the reported overlap between self-injury and suicidality. Many studies combine self-injury and suicide attempts together as “deliberate self-harm”. However, recent research suggests that there are clear differences between these behaviours in their correlates, responses to therapy, and long-term outcomes.<sup>11</sup> There have been recent calls for non-suicidal self-injury to be recognised as a unique syndrome. As recently noted: “People have engaged in self-injury ... in the absence of suicidal intent ... for thousands of years; however, systematic research on this behavior has been lacking.”<sup>12</sup>

Self-injury does not necessarily lead to medical intervention; much is hidden, and reliable statistics about lifetime prevalence are not available. Self-injury causes distress for family, friends and carers and, when it escalates into more serious harm, places financial burden on the health system through emergency medical care and admission to hospital. Planning for prevention, or developing intervention services, may be inadequate unless we understand better the size and nature of the problem.

We aimed to gain an accurate understanding of 4-week and lifetime prevalence of self-injury in the Australian population according to key demographic variables, describe the nature of self-injury (including age of onset, methods, frequency, motivations and help-seeking), and describe associations between self-injury and psychiatric morbidity, suicide and substance use.

## METHODS

A pilot study, using 50 randomly selected households, was conducted to assess question formats and sequence, survey procedures, and suitable times for interviewing. To check validity, the survey was piloted

## ABSTRACT

**Objective:** To understand self-injury and its correlates in the Australian population.

**Design, participants and setting:** Cross-sectional survey, using computer-assisted telephone interview, of a representative sample of 12 006 Australians from randomly selected households.

**Main outcome measures:** Data on demographics, self-injury, psychiatric morbidity, substance use, suicidality, disclosure and help-seeking.

**Results:** In the 4 weeks before the survey, 1.1% of the sample self-injured. For females, self-injury peaked in 15–24-year-olds; for males, it peaked in 10–19-year-olds. The youngest self-injurers were nine boys and three girls in the 10–14-year age group, and the oldest were one female and one male in the 75–84-year age group. Mean age of onset was 17 years, but the oldest age of onset was 44 years for males and 60 years for females. No statistically significant differences existed between those who did and did not self-injure on sex, socioeconomic status or Indigenous status. Most common self-injury method was cutting; most common motivation was to manage emotions. Frequency of self-injury during the 4-week period ranged from 1 to 50 instances (mean, 7). Self-injurers were significantly more psychologically distressed, and also more likely to use substances. Adults who self-injured were more likely to have received a psychiatric diagnosis. Self-injurers were more likely to have experienced recent suicidal ideation (OR, 11.56; 95% CI, 8.14–16.41), and have ever attempted suicide (OR, 8.51; 95% CI, 5.70–12.69). Most respondents told someone about their self-injury but fewer than half sought help.

**Conclusion:** The prevalence of self-injury in Australia in the 4 weeks before the survey was substantial and self-injury may begin at older ages than previously reported. Self-injurers are more likely to have mental health problems and are at higher risk of suicidal thoughts and behaviour than non-self-injurers, and many self-injurers do not seek help.

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with 20 previously or currently self-injuring volunteers.

A random sample of 42 938 Australian addresses was derived from the electronic White Pages telephone directory, and each address was posted an approach letter, participant information sheet, lists of mental health and Indigenous health services, and a summary of survey questions.

Eligible households from the sample were telephoned and, for each contacted household, the last person aged 10 years or over to have a birthday was invited to participate; non-contactable persons were not replaced. Addresses with disconnected telephone lines, fax numbers or modem numbers, as well as those listed as relocations or non-residential properties, were ineligible. Calls were made from January to July 2008 (09:30–21:00 Mondays to Fridays, 09:30–15:00 Saturdays, and 10:00–20:30 Sundays). Interviewers identified themselves, reminded the respondent about the approach letter and survey purpose, and sought permission to conduct the interview. Given ethical issues associated with asking

people younger than 18 years about deliberate self-injury and suicidality over the telephone, parental permission was sought for these respondents. If the parent refused to allow his or her child to be interviewed, he or she could answer on the child's behalf. If required, appointments were made to conduct interviews in Italian, Greek, Vietnamese, Chinese, or Arabic.

Specially trained interviewers from the Harrison Research Health Research Division used computer-assisted telephone interviewing (CATI) to conduct the survey. This allows immediate entry of data from the interviewer's questionnaire screen to the computer database, precise ordering of questions, and an enforced range of checks on each response, with most questions having predetermined response categories. Responses to open-ended questions were transcribed verbatim for later analysis. Ten per cent of each interviewer's work was randomly selected for validation by the supervisor.

After enquiry about demographics, current mental health status and aspects of psycho-

logical functioning (which included the 12-item General Health Questionnaire) interviewers stated: "The following questions are about self-injury. Self-injury means deliberately hurting yourself or any part of your body without meaning to kill yourself. Do you understand this definition?" If the participant said "yes", the interviewer then stated: "If you feel uncomfortable, you don't have to answer these questions." The interviewer then asked: "Over the past 4 weeks, have you self-injured?" If the participant said "yes", responses were sought regarding a predetermined list of self-injury methods. (No detail about self-injury was asked until after self-injury had been acknowledged.) Telephone numbers of relevant support services were offered to participants on survey completion.

The project was carried out according to the National Health and Medical Research Council's *National statement on ethical conduct in research involving humans*<sup>13</sup> and approved by the Behavioural and Social Sciences Ethical Review Committee of the University of Queensland. Harrison Research is a member of the Association of Market and Social Research Organisations and complies with policies on privacy, workplace relations and quality assurance.

### Statistical analyses

Data from the CATI system were imported into SPSS version 17.0 (SPSS Inc, Chicago, Ill, USA), and data cleaning was completed with agreement between two of us (GM, SVS) on response categorisation for answers to open-ended questions.

Comparisons between sample characteristics and the Australian population were conducted using  $\chi^2$  goodness-of-fit tests. Prevalence estimates (proportions of the total sample) were stratified by relevant variables. Comparisons between self-injurers and non-self-injurers on categorical variables (suicidality, psychological distress and substance use) were conducted using the  $\chi^2$  test for independence. Comparisons on continuous variables were conducted using the independent samples *t* test. Respondents who only reported overdosing were not included in comparison analyses.

Data were weighted by age, sex and state, to reflect the structure of the Australian population aged 10 years and over (Australian Bureau of Statistics 2006 Census<sup>14</sup>). Weights reflect unequal sample inclusion probabilities and compensate for differential non-response. Data weighting resulted in some rounding effects. For prevalence estimates stratified by gender and age group,

### 1 Reasons why members of eligible households (n = 31 216) did not participate in the survey

	No. (%)
Adult refusal	14 032 (45.0%)
Parent refusal	671 (2.1%)
Unable to contact household after six attempts	2 341 (7.5%)
Respondent unable to speak English, Italian, Greek, Vietnamese, Chinese or Arabic	726 (2.3%)
Respondent incapacitated and unable to be interviewed (ie, too ill or hearing impaired)	912 (2.9%)
Interview terminated part way through	173 (0.6%)
Respondent unavailable after 10 attempts	351 (1.1%)
<b>Completed interviews</b>	<b>12 010 (38.5%)*</b>

\* Four participants were excluded owing to missing or irreconcilable data, leaving a sample of 12 006

numerators and denominators are rounded within categories and therefore may not appear to sum to overall totals.

### RESULTS

A total of 31 216 eligible households were telephoned (11 722 of 42 938 addresses were ineligible) to reach the target of 12 010 interviews (response rate, 38.5%). Our original plan was to telephone 20 000 households, but this was increased because of the numbers of adult and parent refusals, uncontactable households, and interviews terminated part way through. Reasons why members of eligible households did not participate are shown in Box 1. Of note, only 173 interviewees terminated the interview (mean duration, 13.6 min) part way through. Records for four participants were removed owing to missing or irreconcilable data, leaving a sample of 12 006 participants, representative of all states and territories, and city, rural and remote households.

### Sample characteristics

The sample comprised 5943 males (49.5%), 6063 females (50.5%), 10 531 adults (87.7%, aged 18–100 years), and 1475 children (12.3%, aged 10–17 years). Of those born in Australia, 1.9% (183/9480) identified as Aboriginal or Torres Strait Islander, similar to 2.3% of the Australian population<sup>14</sup> ( $\chi^2 = 0.63$ ,  $P = 0.43$ ). Compared with the Australian population, Asian-born people were under-represented in the sample ( $\chi^2 = 133.08$ ,  $P < 0.001$ ). Overall, participants were more highly educated ( $\chi^2 = 1086.80$ ,  $P < 0.001$ ), and adults were more likely to report their marital status as single ( $\chi^2 = 42.07$ ,  $P < 0.001$ ).

The percentage of participants aged 16–85 years with anxiety disorders was 15.1% (1646/10 898), including general anxiety, social anxiety, post-traumatic stress disorder, obsessive-compulsive disorder, panic disorder, panic attacks and agoraphobia. This was not statistically different to the percentage in the 2007 National Survey of Mental Health and Wellbeing (14.4%,  $\chi^2 = 3.75$ ,  $P = 0.05$ ).<sup>15</sup> Conversely, the percentage of participants aged 16–85 years with a mood disorder was 19.2% (2095/10 898), including depression, post-natal depression, dysthymia, mood disorder not otherwise specified, seasonal affective disorder and bipolar disorder. This was higher than that in the 2007 National Survey of Mental Health and Wellbeing<sup>15</sup> (6.2%,  $\chi^2 = 2979.62$ ,  $P < 0.001$ ).

### Self-injury and key variables

The 4-week prevalence of self-injury for the total sample was 1.1% (133 participants), and the 6-month prevalence was 1.8% (222 participants). Overall lifetime prevalence, including during the 4 weeks before the survey, was 8.1% (978 participants).

### Sex and age

The 4-week prevalence of self-injury for males (61 participants, 1.0%) was not statistically different to that for females (72 participants, 1.2%), and both were similar to the overall 4-week prevalence. For females, self-injury peaked at 15–19 years (23/574, 4.0%) and 20–24 years (16/450, 3.6%). For males, self-injury peaked at 10–14 years (9/388, 2.3%) and 15–19 years (14/629, 2.2%), then declined with age for both sexes. The oldest participants to self-injure in the 4 weeks before the survey were one woman and one

## 2 Methods of self-injury in the 4 weeks before the survey

	Number (%)*		
	Males (n = 61)	Females (n = 72)	Total (n = 133)
Cutting	17 (27.9%)	37 (51.4%)	54 (40.6%)
Scratching	17 (27.9%)	36 (50.0%)	53 (39.8%)
Deliberately hitting body part on hard surface	26 (42.6%)	22 (30.6%)	49 (36.8%)
Punching, hitting or slapping self	26 (42.6%)	19 (26.4%)	45 (33.8%)
Biting	7 (11.5%)	13 (18.1%)	20 (15.0%)
Burning	13 (21.3%)	7 (9.7%)	20 (15.0%)

\* Acknowledging multiple methods means percentages add to more than 100%. ◆

man, both in the 75–84-year age group. The youngest were nine boys and three girls in the 10–14-year age group.

The mean reported age of onset for self-injury was 17.2 years (SD, 10.7 years). The youngest age of onset was 5 years (one female); age of onset was 6 years for four participants (three males, one female), 8 years for three participants (two males, one female) and 9 years for one female. Oldest ages of onset were 60 years (one woman) and 44 years (one man). Six women reported first self-injuring in the age group 45–54 years.

Lifetime prevalence was higher in females (530/6063, 8.7%) than in males (448/5943, 7.5%). It was highest in the 20–24-year age group for females (110/451, 24.4%) and males (79/436, 18.1%) followed by the 15–19-year age group for females (95/574, 16.6%) and 25–34-year age group for males (119/957, 12.4%), then declining with age for both sexes. Lifetime prevalence for males in the 15–19-year age group was 11.6% (73/629).

### Socioeconomic and work status

There were no statistically significant socioeconomic differences between participants who did and did not report self-injury in the 4 weeks before the survey, based on Index of Education and Occupation scores ( $t = -0.30$ ,  $P = 0.77$ ) or Index of Relative Socioeconomic Disadvantage scores ( $t = 0.45$ ,  $P = 0.66$ ). However, those who had ever self-injured scored lower (mean, 1002.5 [SD, 59.3] v mean, 1008.5 [SD, 61.8];  $t = 2.93$ ,  $P = 0.003$ ) on the latter index. Of participants aged 19 years or older with work status as student, 49 of 375 reported ever having self-injured (13.1%).

### Indigenous status and country of birth

A small difference between 4-week prevalence of self-injury in Indigenous (4/183, 2.2%) and non-Indigenous (111/9297, 1.2%) participants did not reach statistical

significance (OR, 1.86; 95% CI, 0.68–5.09). However, participants born in Australia were more likely than those born elsewhere to self-injure in the 4 weeks before the survey (OR, 1.81; 95% CI, 1.08–3.01).

### Methods and frequency of self-injury

Among the participants who self-injured in the 4 weeks before the survey, the most common methods of self-injury were cutting (54, 40.6%), scratching (53, 39.8%), hitting body part on a hard surface (49, 36.8%), and punching, hitting or slapping (45, 33.8%) (Box 2). Most used one method (53, 39.8%). However, 37 (27.8%) used two, 24 (18.0%) used three, 11 (8.3%) used four, and six (4.5%) used five or more methods (two respondents refused to specify self-injury method). Frequency of self-injury during the 4 weeks before the survey ranged from one to 50 instances (mean, 7; mode, 1).

### Motivation for self-injury

The most common motivation for self-injury among the 133 participants who self-injured in the 4 weeks before the survey was to manage emotions, with 41.0% (25/61) of males and 58.3% (42/72) of females reporting this. A need to punish oneself was also common (16/61, 26.2% of males; 13/72, 18.1% of females). Less common were to communicate to others (7/133, 5.3%), remind oneself that he or she is alive (6/133, 4.5%), influence others (5/133, 3.8%), scarify (2/133, 1.5%), get a high (4/133, 3.0%), act on voices encouraging self-injury (1/133, 0.8%), and prevent suicide (2/133, 1.5%). No statistically significant differences in motivation existed between males and females. Other motivations were reported by almost a quarter of the sample, including habit, compulsion, distraction (from chronic pain or from disturbing or abhorrent thoughts), curiosity, for a laugh, and to prove toughness.

### Suicidality

Of those who self-injured in the 4 weeks before the survey, 48.1% (64/133) also experienced suicidal ideation during this period, compared with 7.7% (915 of 11 826 for whom there were complete data) of those who did not self-injure (OR, 11.56; 95% CI, 8.14–16.41). Over a quarter of those who self-injured in the 4 weeks before the survey (35/133, 26.3%) reported a lifetime suicide attempt. This was significantly greater than the percentage of non-self-injurers who had ever attempted suicide (509/11 826, 4.3%; OR, 8.51; 95% CI, 5.70–12.69).

### Psychiatric morbidity

Participants who self-injured in the 4 weeks before the survey had significantly higher levels of psychological distress compared with non-self-injurers; 62.4% (83) of self-injurers scoring in the high-distress range on the General Health Questionnaire, compared with 17.1% (2017/11 826) of non-self-injurers (OR, 8.04; 95% CI, 5.64–11.46). Adults who self-injured were more likely to report receiving a diagnosis of anxiety (OR, 7.68; 95% CI, 5.11–11.52), mood disorder (OR, 5.00; 95% CI, 3.34–7.46), attention deficit hyperactivity disorder (OR, 9.23; 95% CI, 4.82–17.67), eating disorder (OR, 47.35; 95% CI, 12.06–185.92), or personality disorder (OR, 16.81; 95% CI, 3.74–75.51). Those aged 10–17 years were more likely to report being diagnosed with depression (OR, 19.35; 95% CI, 8.52–43.95).

### Substance use

Respondents of all ages were asked about cigarette smoking and substance use. More self-injurers reported being current tobacco smokers (54/133, 40.6%) compared with non-self-injurers (2061/11 826, 17.4%) (OR, 3.33; 95% CI, 2.32–4.76). Self-injurers were more likely to have used prescription drugs (OR, 6.52; 95% CI, 2.33–18.24), stimulants (OR, 3.10; 95% CI, 2.14–4.50), opioids (OR, 6.03; 95% CI, 3.19–11.37) and hallucinogens (OR, 2.88; 95% CI, 1.84–4.50). Of respondents aged 14 and above, more self-injurers reported drinking to get drunk (54/120, 45.0%) compared with non-self-injurers (2382/11 265, 21.1%) (OR, 3.27; 95% CI, 2.26–4.74).

### Disclosure and help-seeking

Most self-injurers (95, 71.4%) had told at least one family member or friend about their self-injury, but fewer than half (42, 31.6%) had asked for help. Few of those who self-injured in the 4 weeks before the survey (19, 14.3%) received medical treatment for their

injuries; only three (2.3%) attended an emergency department, and these three were also admitted to hospital overnight.

## DISCUSSION

In our large, nationally representative study, the 4-week prevalence of self-injury in Australia was 1.1% and the lifetime prevalence was 8.1%, based on a response rate of 38.5%. Our study confirmed that self-injury occurs in the absence of suicidal thoughts (51.9%) and in the absence of a lifetime history of suicide attempts (73.7%).

The only previous nationally representative study of adult self-injury, conducted in the US,<sup>10</sup> was a postal survey of 927 adults (mean age, 46 years; range, 18–90 years) with a response rate of 64%. “Self-mutilation behaviour” was based on Item 48 from the Trauma Symptom Inventory — intentionally hurting yourself in the absence of suicidal intent.<sup>16</sup> Occasional instances were reported by 4% of participants, and 0.3% reported often self-mutilating over the prior 6 months. There was no sex difference in frequency of self-mutilation, but those who reported such behaviour were younger (mean age, 35 years) and about three times more likely to have a history of being sexually abused than those who did not report self-mutilation.

Our equivalent 6-month prevalence of 1.8% may relate to greater specificity of our survey questions. Studies of self-injury among high school students indicate that lifetime prevalence ranges from 14% to 47%.<sup>1,11,17–20</sup> Our equivalent lifetime figures, for the 15–19-year age group, are 16.6% for females and 11.6% for males. Studies of self-injury among university students have indicated that lifetime prevalence ranges from 17% to 41%,<sup>3,21–23</sup> similar to our equivalent value of 13.1%.

Although the pattern of self-injury in the 4 weeks before the survey is in general agreement with earlier work,<sup>24</sup> novel findings in our study are that prevalence for males is higher than previously reported, self-injury may continue into older age, and onset may occur in older age.

In addition, most self-injurers in our study reported discussing the problem with someone, but only a third had sought help. Although only a small percentage received medical help and very few were admitted to hospital, we estimate that, in the 4 weeks before our survey, more than 200 000 Australians self-injured, more than 30 000 sought medical help, and almost 5000 were admitted to hospital (assuming our sample is representative of the Australian population).

Assuming single-night admissions for those hospitalised, the cost would be between \$5 million and \$10 million per month. Unfortunately, hospital separation data report “intentional self-harm” and do not distinguish between suicide attempts and self-injury without suicidal intent, so it is not possible to corroborate these estimates.

Our study is timely because, as a result of considerable research and discussion, non-suicidal self-injury has been proposed as a new diagnosis for inclusion in the forthcoming revision of the *Diagnostic and statistical manual of mental disorders*, due in 2013.<sup>25</sup> This is because self-injury is primarily not about intended suicide and, while self-injury in adults has historically been linked to borderline personality disorder, much self-injury (particularly in adolescents and young adults) relates to a wide variety of disorders.

Surveying a representative sample of Australians on history of self-injury was complex and difficult. To reach the planned sample size, a sampling frame of 31 216 eligible households was required. Also, our ethics approval required that a letter be posted to each address before each interview, explaining the study in detail and providing a warning of the types of questions. This may have contributed to the overall 47.1% refusal rate, higher than for other CATI surveys, but acceptable given the sensitive topic and recent trends of increased refusal for telephone-based surveys in Australia and the US.<sup>26</sup> Conversely, after having agreed to be interviewed, very few people dropped out from the interview. This may indicate that any discomfort is related more to perception of the topic in general, rather than the actual survey questions. The sampling process may of course have resulted in recruitment of participants who felt comfortable in answering sensitive questions about mental health.

Our study may have underestimated the prevalence of self-injury, especially for children, for whom a third of parents responded on the child's behalf. Other factors that may have led to underestimation include that the self-injuring population may be highly mobile, homeless, institutionalised or, in the case of young adults, more likely to use mobile phones than landlines. About 14.7% of Australians live in mobile phone-only households.<sup>27</sup> Our sample is therefore open to a number of biases, even though we can claim a representative national sample on the basis of demographic and mental health parameters. However, these biases were accounted for by weighting of data to reflect

unequal sample inclusion probability and compensate for differential non-response within the sample.<sup>28</sup> As such, our data are representative with respect to the variables used in weighting of data (age and sex for each state or territory).

The rate of self-injury in Australia in the 4 weeks before the survey was substantial, and onset of self-injury may occur at older ages than previously thought. The personal and financial costs are likely to be high, and further research is needed to determine the most appropriate and cost-effective strategies for prevention.

## COMPETING INTERESTS

Graham Martin and Sarah Swannell received a grant for this project from the Australian Government Department of Health and Ageing National Suicide Prevention Strategy. This included reimbursement of travel and accommodation expenses for training professional interviewers. James Harrison has received grants from the World Health Organization, including funding for travel; he has been employed by the Australian Institute for Health and Welfare, which funds the Research Centre for Injury Studies to run the National Injury Surveillance program; he is a member of the International Classification of Diseases Revision Steering Committee and chairs the Australasian Mortality Data Interest Group. Anne Taylor has received grants from the Department of Health and Ageing.

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