

Deliberate Self-Harm in Psychiatric Outpatients Aged 14-35 Years in Singapore

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Abstract

Introduction: The main aim of the study was to identify the prevalence of deliberate self-harm (DSH) in a sample of youth outpatients attending the state psychiatric hospital in Singapore and to identify the sociodemographic and psychological/clinical risk factors associated with DSH. The secondary aim of the study was to examine if different forms of DSH had distinguishing risk factors. **Materials and Methods:** A total of 400 outpatients at the Institute of Mental Health completed a self-report survey comprising sociodemographic questions, the Functional Assessment of Self-Mutilation, Childhood Trauma Questionnaire, Parental Bonding Instrument and the Patient Health Questionnaire Depression Scale. Logistic regression models were used to test the associations. **Results:** The overall prevalence of DSH in our clinical population was 58.8%. Cutting/carving (25.4%) and hitting (20.4%) were the most common forms of DSH in the past 12 months. DSH acts were performed primarily for emotion regulation purposes. The risk factors for DSH in general were younger age group, female gender, abuse history and higher depression scores. Gender and age group were the factors that were differentially associated with cutting and hitting one's self. **Conclusion:** There was a high prevalence of DSH in the psychiatric outpatient population. The risk factors identified in this study are consistent with those of international studies which point to their stability across cultures.

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Key words: Abuse, Asian, Cutting, Depression, Prevalence, Risk factors, Youth

Introduction

The purposeful act of harming oneself physically—usually without suicidal intent such as by cutting, hitting or burning—is referred to in clinical literature by varied nomenclature including non-suicidal self-injury, deliberate self-harm, self-mutilation and parasuicide.¹ Historically regarded as a symptom of borderline personality disorder (BPD),² it has gathered renewed interest in the last 2 decades as a distinct syndrome due to its occurrence and significant impairment in the absence of other key BPD features.³ In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), non-suicidal self-injury is included as a new condition for further study following

argument by proponents in the hope for better understanding, management and treatment of the condition.⁴ The term ‘non-suicidal self-injury’ explicitly excludes behaviours engaged with any level of suicidal intention. By contrast, the term ‘deliberate self-harm’ (DSH) is frequently employed as a more encompassing term for self-injurious behaviours both with and without suicidal intent that have non-fatal outcomes.⁵ This term will be used in the rest of the paper in line with our investigation on deliberate self-injurious behaviours, both with and without the intention of death.

DSH behaviour peaks sharply during the adolescent years. Systematic reviews have pointed to parenting and childhood adverse events (e.g. childhood physical, emotional, sexual

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abuse and emotional neglect) as salient predisposing factors.^{6,7} Glassman et al revealed that emotional abuse during a child's formative years could result in a tendency to internalise critical thinking toward the self.⁸ In the face of stressful events, adolescents who have developed such a cognitive style may be more likely to engage in DSH for self-punishment. Dissociation has also been shown to link the experience of childhood abuse with subsequent self-harming behaviour.⁹ When individuals, especially children, are overwhelmed by an external stressor, they resort to disengagement (i.e. dissociation) as a way of coping. In van der Kolk et al's study, it was found that dissociation was specifically related to cutting oneself.¹⁰ Patton et al, on the other hand, attributed the rise in DSH during adolescence to developmental and life-stage changes such as intensifying peer dynamics, the emergence of greater life stressors and psychological shifts in response to stress such as ruminative and self-blaming coping styles.¹¹

DSH, though distinct from suicidal behaviour, is an important risk factor for suicide.^{12,13} Stanley et al estimated that 55% to 85% of self-injuring individuals have a history of at least 1 suicide attempt.¹⁴ A local study on 207 Singaporeans aged between 15 to 24 years found that resolution of a suicide precipitant was an important factor to differentiate DSH and suicide attempts with low and high perceived lethality.¹⁵ Joiner hypothesised that the ability to end one's life is acquired by overcoming the fear and pain associated with it.¹⁶ By repetitively engaging in non-suicidal self-injury, individuals become desensitised to the pain and fear related to attempting suicide.

Singapore is a city-state country located on the southern tip of the Malay Peninsula which has a small land area of 719 km² and a population of 5.5 million. While local voluntary welfare organisations such as the Singapore Children's Society and the Samaritans of Singapore have observed a spike in youth self-harming (from 2005 to 2013 as reported in the popular press),¹⁷ few systematic studies on DSH have been done in Singapore. The main aim of the study was to identify the prevalence and characteristics of DSH in a relatively large sample of youth outpatients attending a tertiary psychiatric hospital as well as the sociodemographic and psychological/clinical risk factors of DSH. Since many of the studies have focused on cutting behaviours, we also examined if self-hitting was associated with distinct factors.

Materials and Methods

Participants

Participants were 400 outpatients from the Institute of Mental Health (IMH) aged 14-35 years. IMH is Singapore's only state psychiatric hospital and the largest provider of mental health services in the country. The age range considered for our sample was based on 2 local definitions

of youth: 1) the Children and Young Persons Act (1993), which defines a young person as 14-16 years, and 2) the National Youth Council's which defines youths as those aged 15-35 years.¹⁸ There was almost an equal number of male and female (males = 51%) participants. The ethnic distribution of the sample, like the general Singapore population,¹⁹ was mainly Chinese (71%), followed by Malays (18%), Indians (9%) and other ethnicities (3%). The majority of participants were diagnosed with mood disorders (34%), followed by psychotic disorders (23%), adjustment disorders (19%), anxiety disorders (13%), disorders usually diagnosed in childhood (6%) and other diagnoses (6%).

Procedure

Participants were recruited at the child and adult outpatient clinics in IMH between October 2015 and June 2016. Ethics approval was attained and clinicians were informed of the study. Participants either volunteered by responding to posters in the outpatient clinics or they were referred by clinicians who were study team members. Patients were screened for intellectual disability as the researchers felt that the requirements of the study required considerable insight, Primary 6 reading level and the ability to retrospect. An intellectual disability diagnosis was a quick way to identify and exclude those who would most likely not be able to do so. The clinical team ensured that only patients who met these criteria were referred to the research team. The research team also confirmed the patient's history by accessing the medical records after receiving written informed consent to ensure that all inclusion and exclusion criteria were met. Although a waiver of parental consent was obtained, the study was explained to parents of adolescents less than 21 years of age who came accompanied. Nevertheless, the research officers ensured that the self-administered questionnaires were completed independently by the participants.

Measures

Sociodemographic data used in this analysis were age, gender, ethnicity, religion, marital status, highest level of education, and type of housing which is regarded as an indicator for socioeconomic status.

The Functional Assessment of Self Mutilation (FASM) assessed the methods, frequency and functions of self-reported DSH.²⁰ It consisted of a checklist of DSH behaviours; respondents were asked whether they purposefully engaged in each of 11 different DSH behaviours within the past 12 months and, if so, the frequency of occurrence. The scale also asked the age at which DSH first began (onset); and whether any of those behaviours was a suicide attempt. Motivations for DSH was presented as 22 statements in checklist format and rated on a 4-point

Likert scale, ranging from ‘never’ to ‘often’. The FASM has strong psychometric properties, including good reliability and validity with youth samples²¹ and has been used in an adolescent psychiatric outpatient sample locally.²²

The Childhood Trauma Questionnaire (CTQ) is a 28-item inventory that measures the severity of 5 types of childhood adverse events—Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect and Physical Neglect.²³ Each subscale is measured by 5 items rated on a 5-point scale from 1 (never true) to 5 (very often true). It provides a brief, reliable and valid screening for histories of abuse and neglect.²⁴ The internal consistency for all scales was good ($r = 0.85-0.94$) except for the Physical Neglect scale ($r = 0.56$), as has also been found in previous samples.²⁵ The CTQ has been used locally with psychiatric patients.²⁶

The Parental Bonding Index (PBI) is a 25-item instrument that assesses recall of the parental rearing styles in the first 16 years of life.²⁷ Each of the 25 items is rated on a 4-point scale from 0 (very like my parent) to 3 (very unlike my parent). The items are grouped into 2 scales: ‘care’ and ‘overprotection’, and the measure is completed twice, once for each parent. Unhealthy parent-child bonding is indicated by lower ‘care’ scores and higher ‘overprotection’ scores. The PBI has been used in Singapore.²⁸⁻²⁹ The PBI has good psychometric properties³⁰ with good internal consistency of $r = 0.83-0.92$ for this sample.

The Patient Health Questionnaire-8 (PHQ-8) depression scale assesses how often in the past 2 weeks participants

experienced 8 depressive symptoms: which are rated on a 4-point scale ranging from 0 (not at all) to 3 (nearly every day).³¹ The items are summed to yield a total score. The PHQ-8 has been widely used in Singapore³²⁻³³ and has a good internal consistency of $r = 0.92$.

Statistical Analyses

Descriptive statistics were first conducted to examine the characteristics of DSH in an outpatient sample. Then, we conducted a simple logistic regression analysis to examine relationships between sociodemographic and clinical/psychological variables and DSH in order to make decisions about predictors to enter into the multiple logistic regression models to maximise model-fit. We then compared the forward selection and backward elimination methods in multiple logistic regression analyses to estimate the influence of sociodemographic and psychological/clinical factors on 1) any type of DSH, 2) cutting and, 3) hitting. Age, gender, ethnicity, religion, marital status, highest level of education, and type of housing as well as types of childhood adverse events, parental rearing styles and depressive symptoms were included as predictors. In these analyses, several model-fit indices were considered to determine the best fitted regression model. The overall model-fit was examined using Hosmer-Lemeshow goodness-of-fit (GOF) tests and area under the receiver operating characteristics (ROC) curve while multicollinearity between predictors was examined using variance inflation factor values. Statistical significance was evaluated at the 0.05 level using 2-sided tests.

Table 1. Sociodemographic Profile of Sample

| | Overall Sample | | 14 – 21 Years | | 22 – 35 Years | | P Value |
|------------------|----------------|-------|---------------|-------|---------------|-------|---------|
| | n | % | n | % | n | % | |
| Gender | | | | | | | |
| Female | 195 | 48.75 | 97 | 50.79 | 98 | 46.89 | 0.436 |
| Male | 205 | 51.25 | 94 | 49.21 | 111 | 53.11 | |
| Ethnicity | | | | | | | |
| Chinese | 284 | 71.00 | 143 | 74.87 | 141 | 67.46 | 0.267 |
| Malay | 71 | 17.75 | 30 | 15.71 | 41 | 19.62 | |
| Indian | 34 | 8.50 | 12 | 6.28 | 22 | 10.53 | |
| Others | 11 | 2.75 | 6 | 3.14 | 5 | 2.39 | |
| Religion | | | | | | | |
| Christianity | 111 | 27.75 | 49 | 25.65 | 62 | 29.67 | 0.215 |
| Buddhism | 89 | 22.25 | 47 | 24.61 | 42 | 20.10 | |
| Hinduism | 16 | 4.00 | 6 | 3.14 | 10 | 4.78 | |
| Islam | 74 | 18.50 | 30 | 15.71 | 44 | 21.05 | |
| Taoism | 13 | 3.25 | 4 | 2.09 | 9 | 4.31 | |
| Free thinker | 79 | 19.75 | 10 | 5.24 | 8 | 3.83 | |
| Others | 18 | 4.50 | 45 | 23.56 | 34 | 16.27 | |

HDB: Housing and Development Board; NITEC: National Institute of Technical Education Certificate; PSLE: Primary School Leaving Examination

*Due to zero cell counts in certain groups, chi-squared tests were conducted after regrouping the categories (e.g. married, separated and divorced were merged as ever married while degree holders were merged with Other diploma and professional qualification).

Table 1. Sociodemographic Profile of Sample (Cont'd)

| | 14 – 21 Years | | 22 – 35 Years | | <i>P</i> Value | | |
|----------------------------------|---------------|-------|---------------|-------|----------------|-------|----------|
| | <i>n</i> | % | <i>n</i> | % | | | |
| Marital Status | | | | | | | |
| Single | 356 | 89.00 | 189 | 98.95 | 167 | 79.90 | <0.0001* |
| Married | 35 | 8.75 | 0 | 0.00 | 35 | 16.75 | |
| Separated | 4 | 1.00 | 1 | 0.52 | 3 | 1.44 | |
| Divorced | 5 | 1.25 | 1 | 0.52 | 4 | 1.91 | |
| Education level | | | | | | | |
| PSLE and lower | 29 | 7.25 | 25 | 13.09 | 4 | 1.91 | <0.0001* |
| Secondary | 40 | 10.00 | 30 | 15.71 | 10 | 4.78 | |
| 'O'/'N' level | 113 | 28.25 | 72 | 37.70 | 41 | 19.62 | |
| 'A' level | 23 | 5.75 | 14 | 7.33 | 9 | 4.31 | |
| NITEC/higher NITEC | 45 | 11.25 | 16 | 8.38 | 29 | 13.88 | |
| Polytechnic diploma | 83 | 20.75 | 24 | 12.57 | 59 | 28.23 | |
| Other professional qualification | 29 | 7.25 | 10 | 5.24 | 19 | 9.09 | |
| Degree and higher | 38 | 9.50 | 0 | 0.00 | 38 | 18.18 | |
| Type of housing | | | | | | | |
| Semi-D/terrace | 15 | 3.75 | 8 | 4.19 | 7 | 3.35 | 0.076 |
| Private flat/condo | 36 | 9.00 | 25 | 13.09 | 11 | 5.26 | |
| 4/5 room HDB | 230 | 57.50 | 106 | 55.50 | 124 | 59.33 | |
| 2/3 room HDB | 89 | 22.25 | 42 | 21.99 | 47 | 22.49 | |
| 1 room HDB | 17 | 4.25 | 5 | 2.62 | 12 | 5.74 | |
| Others | 13 | 3.25 | 5 | 2.62 | 8 | 3.83 | |
| Primary diagnosis | | | | | | | |
| Adjustment disorders | 65 | 16.29 | 39 | 20.53 | 26 | 12.44 | <0.0001 |
| Anxiety disorders | 61 | 15.29 | 29 | 15.26 | 32 | 15.31 | |
| Childhood disorders | 21 | 5.26 | 16 | 8.42 | 5 | 2.39 | |
| Mood disorders | 137 | 34.34 | 72 | 37.89 | 65 | 31.10 | |
| Schizophrenia spectrum | 91 | 22.81 | 18 | 9.47 | 73 | 34.93 | |
| Others | 24 | 6.02 | 16 | 8.42 | 8 | 3.83 | |

HDB: Housing and Development Board; NITEC: National Institute of Technical Education Certificate; PSLE: Primary School Leaving Examination

*Due to zero cell counts in certain groups, chi-squared tests were conducted after regrouping the categories (e.g. married, separated and divorced were merged as ever married while degree holders were merged with Other diploma and professional qualification).

Results

The sociodemographic profile of the sample is shown in Table 1. The mean age of the sample was 23.3 years (SD = 6.04).

Prevalence/Frequencies and Descriptive Characteristics

The mean age of onset of DSH was 16.5 years (range: 6-34 years) amongst the patients included in the study. A total of 58.8% had committed at least 1 of the self-injurious behaviours in the FASM checklist in the past 12 months. The prevalence of committing any of the DSH behaviours was significantly higher in the 14-21 years age group (72.8%) compared to the 22-35 years age group (45.9%).

As shown in Table 2, the most common forms of DSH were hitting self on purpose, cutting/carving self, biting self and picking on a wound. Table 2 also shows the number of times the acts were committed. Most of those who had harmed themselves had done so 2-5 times in the past 12 months. Notably, a large proportion of self-harmers had done the acts over 11 times in the past 12 months (20.5%-36% for the most common forms of DSH). The 5 most highly endorsed motivations of DSH reported were 'to stop bad feelings (66.2%)', 'to relieve feeling numb/empty (64.3%)', and 'to punish self (59.1%)', 'to feel something even if it was pain (53.7%)' and 'to feel relaxed (47.2%)'. Out of those who had ever self-harmed, 32% reported that they ever tried to kill themselves.

Table 2. Frequency and Percentages of DSH in the Past 12 Months

| Type of DSH | Ever DSH in Past 12 Months | | No. of Times in the Past 12 Months | | | | | | | |
|--|----------------------------|------|------------------------------------|------|-------------|------|--------------|------|-----------|------|
| | n | % | Once | | 2 – 5 Times | | 6 – 10 Times | | >11 Times | |
| | | | n | % | n | % | n | % | n | % |
| Hit self on purpose | 157 | 39.3 | 13 | 8.3 | 67 | 42.7 | 33 | 21 | 42 | 26.8 |
| Cut/carved on skin | 122 | 30.5 | 16 | 13.1 | 61 | 50 | 19 | 15.6 | 25 | 20.5 |
| Bit self | 89 | 22.3 | 10 | 11.2 | 32 | 36 | 15 | 16.9 | 32 | 36 |
| Picked at a wound | 83 | 20.8 | 8 | 9.6 | 44 | 53 | 13 | 15.7 | 17 | 20.5 |
| Pulled hair out | 60 | 15 | 8 | 13.3 | 25 | 41.7 | 7 | 11.7 | 20 | 33.3 |
| Scraped skin | 51 | 12.8 | 5 | 9.8 | 29 | 56.9 | 3 | 5.9 | 14 | 27.5 |
| Picked areas of body to the point of drawing blood | 43 | 10.8 | 3 | 7 | 17 | 39.5 | 9 | 20.9 | 14 | 32.6 |
| Burned skin | 29 | 7.3 | 4 | 13.8 | 18 | 62.1 | 4 | 13.8 | 3 | 10.3 |
| Gave self a tattoo | 24 | 6 | 7 | 29.2 | 11 | 45.8 | 2 | 8.3 | 2 | 8.3 |
| Inserted objects under nails or skin | 13 | 3.3 | 1 | 7.7 | 7 | 53.8 | 1 | 7.7 | 4 | 30.8 |
| "Erased" skin | 11 | 2.8 | 1 | 9.1 | 5 | 45.5 | 2 | 18.2 | 3 | 27.3 |
| Any of the above | 235 | 58.8 | | | | | | | | |

DSH: Deliberate self-harm

Sociodemographic and Psychological/Clinical Correlates of DSH

Simple and multiple logistic regression analyses examining the association between sociodemographic and psychological/clinical variables and 1) any DSH, 2) self-cutting, and 3) self-hitting are presented in Tables 3, 4 and 5, respectively. The forward selection and backwards elimination (data available on request) models yielded identical findings for 'any DSH behaviour' and 'hitting'.

Those who endorsed any of the 11 types of DSH assessed tended to belong to the younger age group, female gender, had a mood disorder (vs anxiety or schizophrenia spectrum disorder), higher sexual abuse score and higher PHQ depression score (Table 3). We observed some discrepancy between the forwards selection and backwards elimination model when predicting cutting. While both models identified younger age group, female and higher PHQ score as risk factors, the backwards model did not identify mood disorder (vs anxiety disorder) as a predictor. Additionally the forwards selection model (Table 4) found emotional abuse to be a significant predictor whereas the backwards elimination model found physical abuse to be a significant predictor. No multicollinearity was observed between predictors. Since logistic regression results derived from forwards selection model (Pseudo $R^2 = 27.42\%$, GOF tests = 365.58, P value = 0.5112, ROC = 0.841) provided slightly better fit indices than backwards elimination model (Pseudo $R^2 = 26.14\%$, GOF tests = 318.71, P value = 0.3397, ROC = 0.836), the forward selection model was used.

Lastly, those who endorsed hitting themselves had higher emotional abuse and higher PHQ depression scores (Table 5).

Discussion

The overall prevalence of DSH in our sample of psychiatric outpatients was 58.8%, and 72.8% and 45.9% for those aged 14-21 and those aged 22-35, respectively—which mirrored the elevated rates typically observed in adolescent/young adult psychiatric samples (40% to 80%).³⁴ Our finding is far higher than that of an earlier local study by Loh et al which reported a rate of 23.6% in a similar psychiatric outpatient sample of adolescents aged 12-19 years.³⁵ A likely reason for this wide margin of difference could be that DSH data in Loh's study was extracted through medical records whereas the current study utilised the multi-item FASM. DSH is a notoriously furtive behaviour and disclosure through an anonymous survey may be less threatening than a face-to-face consultation, particularly where a parent might be present. In addition, multi-item instruments have been found to produce significantly higher prevalence rates.⁵ Prevalence estimates for DSH rates using behavioural-checklist measures assessment have been shown to be nearly 3 times higher than single-item assessments.⁵ However, while it is difficult to determine if single-item assessments are underestimating the prevalence or if the behavioural assessments are inflating rates, an assessment bias clearly exists.

Our study also pointed to the use of DSH primarily for emotion-regulating functions (rather than to regulate one's social environment) and the repetitiveness of the behaviour. DSH has been construed as having addictive qualities due to its tension-releasing properties.³⁶⁻³⁷ This relatively fast and easily accessible means of serving the proposed functions can be performed quickly in virtually any context

Table 3. Sociodemographic and Psychological/Clinical Correlates of Any Form of Self-Harm

| | Simple Logistic Regression | | | | Multiple Logistic Regression | | | |
|----------------------------------|----------------------------|---------|--------|------|------------------------------|---------|--------|------|
| | Odds Ratio | P Value | 95% CI | | Odds Ratio | P Value | 95% CI | |
| Sociodemographic variables | | | | | | | | |
| Age group | | | | | | | | |
| 14 – 21 years | 3.15 | 0.000 | 2.07 | 4.78 | 2.85 | 0.000 | 1.62 | 5.02 |
| 22 – 35 years | (ref) | | | | | | | |
| Gender | | | | | | | | |
| Male | (ref) | | | | | | | |
| Female | 2.58 | 0.000 | 1.71 | 3.89 | 2.93 | 0.000 | 1.67 | 5.14 |
| Ethnicity | | | | | | | | |
| Chinese | (ref) | | | | | | | |
| Malay | 1.11 | 0.707 | 1.71 | 3.89 | | | | |
| Indian | 2.12 | 0.064 | 0.96 | 4.71 | | | | |
| Others | 1.34 | 0.649 | 0.38 | 4.67 | | | | |
| Religion | | | | | | | | |
| Christianity | (ref) | | | | | | | |
| Buddhism | 0.7 | 0.209 | 0.40 | 1.22 | | | | |
| Hinduism | 1.5 | 0.479 | 0.49 | 4.61 | | | | |
| Islam | 0.89 | 0.715 | 0.49 | 1.62 | | | | |
| Taoism | 1.09 | 0.885 | 0.34 | 3.55 | | | | |
| Freethinker | 0.68 | 0.452 | 0.25 | 1.85 | | | | |
| Others | 1.47 | 0.211 | 0.80 | 2.70 | | | | |
| Marital status | | | | | | | | |
| Single | (ref) | | | | | | | |
| Married | 1.07 | 0.857 | 0.53 | 2.17 | | | | |
| Divorced/separated | 1.42 | 0.622 | 0.35 | 5.78 | | | | |
| Education level | | | | | | | | |
| PSLE and lower | (ref) | | | | | | | |
| Secondary | 0.66 | 0.451 | 0.22 | 1.94 | | | | |
| O/'N' level | 0.56 | 0.221 | 0.22 | 1.42 | | | | |
| A' level | 0.49 | 0.248 | 0.15 | 1.63 | | | | |
| NITEC/higher NITEC | 0.52 | 0.224 | 0.18 | 1.49 | | | | |
| Polytechnic diploma | 0.33 | 0.021 | 0.13 | 0.85 | | | | |
| Other professional qualification | 0.39 | 0.102 | 0.13 | 1.20 | | | | |
| Degree | 0.19 | 0.002 | 0.06 | 0.54 | | | | |
| Type of housing | | | | | | | | |
| Semi-D/terrace | 1.09 | 0.869 | 0.38 | 3.18 | | | | |
| Private condo | 2.19 | 0.055 | 0.98 | 4.86 | | | | |
| 4/5 room | (ref) | | | | | | | |
| 2/3 room | 0.94 | 0.790 | 0.57 | 1.53 | | | | |
| 1 room | 1.75 | 0.308 | 0.60 | 5.13 | | | | |
| Others | 0.32 | 0.067 | 0.10 | 1.08 | | | | |

CI: Confidence interval; GOF: Goodness-of-fit; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination; ROC: Receiver operating characteristics

Table 3. Sociodemographic and Psychological/Clinical Correlates of Any Form of Self-Harm (Cont'd)

| | Simple Logistic Regression | | | | Multiple Logistic Regression | | | |
|--|----------------------------|---------|--------|------|------------------------------|---------------------------|--------|------|
| | Odds Ratio | P Value | 95% CI | | Odds Ratio | P Value | 95% CI | |
| Clinical/psychological variables (diagnosis) | | | | | | | | |
| Mood disorders | (ref) | | | | | | | |
| Adjustment disorders | 0.93 | 0.838 | 0.47 | 1.83 | 1.19 | 0.681 | 0.51 | 2.78 |
| Anxiety disorders | 0.25 | 0.000 | 0.13 | 0.46 | 0.28 | 0.002 | 0.12 | 0.62 |
| Childhood disorders | 0.25 | 0.004 | 0.10 | 0.64 | 0.49 | 0.244 | 0.15 | 1.62 |
| Schizophrenia | 0.2 | 0.000 | 0.11 | 0.35 | 0.45 | 0.040 | 0.21 | 0.96 |
| Others | 0.55 | 0.199 | 0.22 | 1.37 | 1.23 | 0.717 | 0.41 | 3.72 |
| Parental bonding | | | | | | | | |
| Mother care | 0.96 | 0.003 | 0.94 | 0.99 | | | | |
| Mother overprotection | 1.02 | 0.178 | 0.99 | 1.05 | | | | |
| Father care | 0.98 | 0.125 | 0.96 | 1.01 | | | | |
| Father overprotection | 1.03 | 0.072 | 1.00 | 1.06 | | | | |
| Childhood trauma | | | | | | | | |
| Emotional abuse | 1.13 | 0.000 | 1.09 | 1.18 | | | | |
| Physical abuse | 1.07 | 0.001 | 1.03 | 1.12 | | | | |
| Sexual abuse | 1.1 | 0.001 | 1.04 | 1.16 | 1.08 | 0.050 | 1.00 | 1.17 |
| Emotional neglect | 1.06 | 0.003 | 1.02 | 1.10 | | | | |
| Physical neglect | 1 | 0.968 | 0.92 | 1.09 | | | | |
| Depression PHQ-8 score | 1.16 | 0.000 | 1.12 | 1.20 | 1.11 | <0.0001 | 1.07 | 1.17 |
| Fit indices | | | | | | | | |
| Pseudo-R ² | | | | | | 25.55% | | |
| Hosmer-Lemeshow GOF tests | | | | | | 307.91 (P value = 0.4266) | | |
| ROC | | | | | | 0.824 | | |

CI: Confidence interval; GOF: Goodness-of-fit; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination; ROC: Receiver operating characteristics

and does not require the time and paraphernalia involved in other behaviours that may serve a similar function (e.g. exercise, alcohol) making it an attractive behaviour for adolescents and young adults who have difficulty regulating their emotions and behaviour and who may not have ready access to alcohol or drugs.

The risk factors identified for committing any form of DSH for our sample were younger age group, female, diagnosis of mood disorder, elevated depression score and sexual abuse which are consistent with extant literature. The risk factors identified from our analysis predicting 'cutting' were almost identical to that of the general model (i.e. any form of DSH), with the only difference being emotional abuse (rather than sexual abuse) being identified as a risk factor, which suggests that the phenomenon of DSH in general or at least the types of DSH listed in the FASM (e.g. picking a wound, scraping the skin, picking skin to the point of drawing blood) are similar. In our preliminary work consisting of a subset of this sample, Peh and colleagues found that a history of childhood maltreatment in general was associated with current depression and difficulties

in emotion regulation.³⁸ Peh and colleagues, through mediation analysis demonstrated emotional dysregulation to be the mechanism linking childhood maltreatment and DSH. While childhood maltreatment was a distal factor, the need to avoid or escape unwanted emotions which were the most highly endorsed motivations in our survey could be proximal factors. Literature on the development of DSH suggests that poor modelling of emotion regulation by abusive caregivers³⁹ and internalisation of abuse (e.g. self-criticism)⁸ to be some of the pathways leading to DSH.

Our secondary aim was to compare 'cutting' and 'hitting'. While both behaviours were associated with emotional abuse and elevated depression scores, female gender and younger age group were associated with cutting but not hitting. The socialisation hypothesis has been proposed for the preference for cutting among females. In particular, You et al asserted that women are socialised to internalise negative emotions and cutting can be viewed as acting in behaviour that tends to leave less extensive bodily damage than acting out displays of violent behaviours like punching

Table 4. Sociodemographic and Psychological/Clinical Correlates of Cutting

| | Simple Logistic Regression | | | | Multiple Logistic Regression | | | |
|----------------------------------|----------------------------|---------|--------|------|------------------------------|---------|--------|------|
| | Odds Ratio | P Value | 95% CI | | Odds Ratio | P Value | 95% CI | |
| Sociodemographic variables | | | | | | | | |
| Age group | | | | | | | | |
| 14 – 21 years | 3.35 | 0.000 | 2.13 | 5.26 | 2.78 | 0.001 | 1.49 | 5.21 |
| 22 – 35 years | (ref) | | | | | | | |
| Gender | | | | | | | | |
| Male | (ref) | | | | | | | |
| Female | 4.38 | 0.000 | 2.74 | 6.98 | 4.86 | <0.0001 | 2.56 | 9.21 |
| Ethnicity | | | | | | | | |
| Chinese | (ref) | | | | | | | |
| Malay | 1.13 | 0.682 | 0.64 | 1.98 | | | | |
| Indian | 1.98 | 0.065 | 0.96 | 4.08 | | | | |
| Others | 1.43 | 0.575 | 0.41 | 5.02 | | | | |
| Religion | | | | | | | | |
| Christianity | (ref) | | | | | | | |
| Buddhism | 0.82 | 0.543 | 0.44 | 1.54 | | | | |
| Hinduism | 0.79 | 0.698 | 0.24 | 2.62 | | | | |
| Islam | 1.13 | 0.697 | 0.6 | 2.14 | | | | |
| Taoism | 0.71 | 0.618 | 0.18 | 2.74 | | | | |
| Freethinker | 1.18 | 0.758 | 0.41 | 3.42 | | | | |
| Others | 1.37 | 0.313 | 0.74 | 2.53 | | | | |
| Marital status | | | | | | | | |
| Single | (ref) | | | | | | | |
| Married | 0.66 | 0.325 | 0.29 | 1.51 | | | | |
| Divorced/separated | 1.79 | 0.393 | 0.47 | 6.79 | | | | |
| Education level | | | | | | | | |
| PSLE and lower | (ref) | | | | | | | |
| Secondary | 0.50 | 0.164 | 0.19 | 1.33 | | | | |
| O'/'N' level | 0.31 | 0.007 | 0.13 | 0.72 | | | | |
| A' level | 0.17 | 0.005 | 0.05 | 0.59 | | | | |
| NITEC/higher NITEC | 0.20 | 0.002 | 0.07 | 0.54 | | | | |
| Polytechnic diploma | 0.18 | 0.000 | 0.07 | 0.45 | | | | |
| Other professional qualification | 0.23 | 0.010 | 0.08 | 0.7 | | | | |
| Degree | 0.09 | 0.000 | 0.03 | 0.31 | | | | |
| Type of housing | | | | | | | | |
| Semi-D/terrace | 1.35 | 0.593 | 0.45 | 4.12 | | | | |
| Private condo | 1.94 | 0.074 | 0.94 | 3.99 | | | | |
| 4/5 room | (ref) | | | | | | | |
| 2/3 room | 1.31 | 0.319 | 0.77 | 2.23 | | | | |
| 1 room | 3.05 | 0.028 | 1.13 | 8.25 | | | | |
| Others | 0.49 | 0.366 | 0.11 | 2.29 | | | | |

CI: Confidence interval; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination

Table 4. Sociodemographic and Psychological/Clinical Correlates of Cutting (Cont'd)

| | Simple Logistic Regression | | | | Multiple Logistic Regression | | | |
|--|----------------------------|---------|--------|-------|------------------------------|---------|--------|------|
| | Odds Ratio | P Value | 95% CI | | Odds Ratio | P Value | 95% CI | |
| Clinical/psychological variables (diagnosis) | | | | | | | | |
| Mood disorders | (ref) | | | | | | | |
| Adjustment disorders | 0.89 | 0.689 | 0.49 | 1.61 | 1.75 | 0.183 | 0.77 | 3.98 |
| Anxiety disorders | 0.24 | 0.000 | 0.11 | 0.52 | 0.35 | 0.034 | 0.13 | 0.92 |
| Childhood disorders | 0.13 | 0.008 | 0.03 | 0.59 | 0.44 | 0.355 | 0.08 | 2.52 |
| Schizophrenia | 0.25 | 0.000 | 0.13 | 0.47 | 0.73 | 0.506 | 0.29 | 1.83 |
| Others | 0.51 | 0.165 | 0.2 | 1.32 | 1.58 | 0.452 | 0.48 | 5.16 |
| Parental bonding | | | | | | | | |
| Mother care | 0.94 | 0.000 | 0.92 | 0.97 | | | | |
| Mother overprotection | 1.04 | 0.014 | 1.01 | 1.073 | | | | |
| Father care | 0.98 | 0.107 | 0.95 | 1.005 | | | | |
| Father overprotection | 1.04 | 0.012 | 1.01 | 1.074 | | | | |
| Childhood trauma | | | | | | | | |
| Emotional abuse | 1.16 | 0.000 | 1.11 | 1.21 | 1.11 | 0.001 | 1.04 | 1.17 |
| Physical abuse | 1.10 | 0.000 | 1.06 | 1.149 | | | | |
| Sexual abuse | 1.10 | 0.000 | 1.05 | 1.154 | | | | |
| Emotional neglect | 1.08 | 0.000 | 1.04 | 1.126 | | | | |
| Physical neglect | 1.05 | 0.296 | 0.96 | 1.147 | | | | |
| Depression score | | | | | | | | |
| PHQ-8 | 1.13 | 0.000 | 1.09 | 1.166 | 1.1 | 0.000 | 1.05 | 1.16 |
| Fit indices | | | | | | | | |
| Pseudo-R ² | | | | | | | 27.42% | |

CI: Confidence interval; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination

walls.⁴⁰ Self-hitting has been found to be more associated with males in several studies but our study—like the results of Bresin’s meta-analysis on gender differences in non-suicidal self-injury—did not find this gender bias.⁴¹ We argue that the association between younger age and cutting (but not hitting) is related to age-defined social expectations. Miskeg and McGee⁴² highlighted how popular psychology has attributed cutting oneself to “teenage angst” or emotionality associated with simply being an adolescent. Thus, it follows that cutting is seen as a behaviour that one should eventually outgrow. Thus, judgements against cutting in adulthood may be intensified as the individual is perceived as both emotionally unstable and teen-like. DSH by cutting often leaves very telling scars. Hitting by contrast causes bruising or in more severe cases, fractures but usually do not result in permanent disfigurement. Thus, we postulate that the visibility and resulting shame of wounds from cutting results in higher social costs to adults compared to hitting, though further studies are required to corroborate these postulations.

In contrast to earlier studies that established an association between DSH and low education level as well as low

socioeconomic status,⁶ we did not observe these associations in the final regression models. We observed some evidence that DSH was less likely to occur among those with higher education level, though the pattern of finding for living arrangement was inconsistent. We also did not find any association between DSH and the PBI in the final models though univariate analyses were significant. We observed high intercorrelations between the CTQ and PBI scales. Thus, it is likely that PBI variables did not contribute uniquely after the CTQ variables were added in the logistic regression models.

We noted that 32% of those who had DSH had attempted suicide. Although this percentage is lower than Stanley et al’s prediction,¹⁴ it nevertheless constitutes a substantial proportion of individuals who commit DSH. According to the addiction model of DSH,⁴³ frequency and severity of DSH increases over time for individuals to achieve the same effect, which may lead one along the path of fatality whether intentional or unintentional. DSH can be reduced using selective serotonin reuptake inhibitor (e.g. fluoxetine) by improving impulse control. Due to the addictive nature of DSH, opioid antagonist, naltrexone was found to be

Table 5. Sociodemographic and Psychological/Clinical Correlates of Hitting

| | Simple Logistic Regression | | | Multiple Logistic Regression | | |
|-----------------------------------|----------------------------|---------|--------|------------------------------|---------|--------|
| | Odds Ratio | P Value | 95% CI | Odds Ratio | P Value | 95% CI |
| Sociodemographic variables | | | | | | |
| Age group | | | | | | |
| 14 – 21 years | 1.66 | 0.014 | 1.11 | 2.49 | | |
| 22 – 35 years | (ref) | | | | | |
| Gender | | | | | | |
| Male | (ref) | | | | | |
| Female | 1.84 | 0.003 | 1.23 | 2.77 | | |
| Ethnicity | | | | | | |
| Chinese | (ref) | | | | | |
| Malay | 1.29 | 0.352 | 0.76 | 2.18 | | |
| Indian | 1.98 | 0.062 | 0.97 | 4.04 | | |
| Others | 2.11 | 0.227 | 0.63 | 7.08 | | |
| Religion | | | | | | |
| Christianity | (ref) | | | | | |
| Buddhism | 0.92 | 0.784 | 0.52 | 1.64 | | |
| Hinduism | 2.11 | 0.167 | 0.73 | 6.09 | | |
| Islam | 1.12 | 0.712 | 0.61 | 2.05 | | |
| Taoism | 1.03 | 0.965 | 0.32 | 3.35 | | |
| Freethinker | 0.47 | 0.207 | 0.14 | 1.52 | | |
| Others | 1.31 | 0.371 | 0.73 | 2.35 | | |
| Marital status | | | | | | |
| Single | (ref) | | | | | |
| Married | 1.73 | 0.122 | 0.86 | 3.48 | | |
| Divorced/separated | 1.31 | 0.691 | 0.35 | 4.96 | | |
| Education level | | | | | | |
| PSLE and lower | (ref) | | | | | |
| Secondary | 1.11 | 0.826 | 0.43 | 2.91 | | |
| O/'N' level | 0.98 | 0.955 | 0.43 | 2.22 | | |
| A' level | 0.79 | 0.680 | 0.26 | 2.41 | | |
| NITEC/higher NITEC | 0.82 | 0.681 | 0.32 | 2.11 | | |
| Polytechnic diploma | 0.56 | 0.192 | 0.24 | 1.34 | | |
| Other professional qualification | 1 | 1.000 | 0.36 | 2.82 | | |
| Degree | 0.38 | 0.071 | 0.13 | 1.09 | | |
| Type of housing | | | | | | |
| Semi-D/terrace | 1.06 | 0.920 | 0.36 | 3.07 | | |
| Private condo | 1.27 | 0.512 | 0.62 | 2.58 | | |
| 4/5 room | (ref) | | | | | |
| 2/3 room | 0.98 | 0.935 | 0.59 | 1.62 | | |
| 1 room | 1.41 | 0.497 | 0.52 | 3.78 | | |
| Others | 0.7 | 0.569 | 0.21 | 2.35 | | |

CI: Confidence interval; GOF: Goodness-of-fit; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination; ROC: Receiver operating characteristics

Table 5. Sociodemographic and Psychological/Clinical Correlates of Hitting (Cont'd)

| | Simple Logistic Regression | | | | Multiple Logistic Regression | | | |
|--|----------------------------|---------|--------|------|------------------------------|---------|---------------------------|------|
| | Odds Ratio | P Value | 95% CI | | Odds Ratio | P Value | 95% CI | |
| Clinical/psychological variables (diagnosis) | | | | | | | | |
| Mood disorders | (ref) | | | | | | | |
| Adjustment disorders | 0.68 | 0.209 | 0.38 | 1.24 | | | | |
| Anxiety disorders | 0.47 | 0.019 | 0.25 | 0.89 | | | | |
| Childhood disorders | 0.45 | 0.107 | 0.17 | 1.19 | | | | |
| Schizophrenia | 0.29 | 0.000 | 0.16 | 0.52 | | | | |
| Others | 0.37 | 0.039 | 0.14 | 0.95 | | | | |
| Parental bonding | | | | | | | | |
| Mother care | 0.95 | 0.000 | 0.92 | 0.97 | | | | |
| Mother overprotection | 1.03 | 0.024 | 1.00 | 1.07 | | | | |
| Father care | 0.97 | 0.015 | 0.95 | 0.99 | | | | |
| Father overprotection | 1.03 | 0.074 | 1.00 | 1.06 | | | | |
| Childhood trauma | | | | | | | | |
| Emotional abuse | 1.15 | 0.000 | 1.10 | 1.20 | | | | |
| Physical abuse | 1.09 | 0.000 | 1.04 | 1.13 | | | | |
| Sexual abuse | 1.1 | 0.000 | 1.05 | 1.16 | | | | |
| Emotional neglect | 1.08 | 0.000 | 1.04 | 1.12 | 1.11 | <0.0001 | 1.05 | 1.17 |
| Physical neglect | 1 | 0.939 | 0.92 | 1.09 | | | | |
| Depression score | | | | | | | | |
| PHQ-8 | 1.17 | 0.000 | 1.13 | 1.21 | 1.15 | <0.0001 | 1.10 | 1.20 |
| Fit indices | | | | | | | | |
| Pseudo-R ² | | | | | | | 19.77% | |
| Hosmer-Lemeshow GOF tests | | | | | | | 264.274, P value = 0.2736 | |
| ROC | | | | | | | 0.788 | |

CI: Confidence interval; GOF: Goodness-of-fit; NITEC: National Institute of Technical Education Certificate; PHQ-8: Patient Health Questionnaire-8; PSLE: Primary School Leaving Examination; ROC: Receiver operating characteristics

effective in severe cases of DSH.⁴⁴ Other researchers have also hypothesised that DSH and suicide attempt are on the same spectrum of self-destructive acts, wherein a suicide attempt might ensue with an accumulation of risk factors, greater loading of psychopathology and environmental difficulties.¹ Furthermore, DSH without intention to attempt suicide does not involve a life or death debate. In contrast, suicide attempts often involve high wish to die and low wish to live.⁴⁵ A previous local study on adults found that more men than women made suicide attempts with higher perceived lethality⁴⁶ but whether gender plays such a role in DSH among adolescent and young adults remains unknown. Future studies are required to identify specific factors that increase the risk of suicide attempts among individual with DSH so that appropriate interventions can be initiated.

Limitations and Strengths

Our study had several limitations. Firstly, it was based on cross-sectional data. Therefore, causality cannot be inferred.

Secondly, the study relied on retrospective report and was thus prone to recall error as well as the biases associated with self-report. Thirdly, the sample comprised a help-seeking group. Given that youths who self-harm rarely present to clinical services, the results might not be generalisable to the same in the community. Additionally, we were not able to establish the non-participation rate, thus those who participated could have been very different from outpatients who did not participate. Fourthly, this study did not include drug overdose as one of the methods of DSH. In Singapore, more than 50% of women who had drug overdose perceive their attempts as non-lethal and the patient might perceive drug overdose, especially with small quantities of drugs as DSH.⁴⁷ Lastly, this study did not capture symptoms of psychotic illness, borderline personality disorder, psychosomatic complaints (e.g. headaches), reports of adverse life events such as unemployment, relationship problems and quarrels, experience of negative feelings, and usage of alcohol which were associated with risk of

repeated suicide attempts⁴⁸ but the effect of these factors on DSH in adolescents and young adults remain unknown.

One of the strengths of this study is that it is one of the few local studies to use a standardised psychometric tool to assess DSH. The mode of self-completion was likely to facilitate honest reporting. Next, we had a relatively large sample size that provided sufficient power to conduct the above analysis. Our findings contribute considerably to the general dearth of empirical research pertaining to DSH as much of coverage in the local press has been based on anecdotal evidence. Our findings also support the use of evidence-based therapies used to treat DSH in Western countries given that the risk factors of DSH are very similar.

Clinical Implication and Conclusion

A previous local study in older Singaporeans urged psychiatrists to aggressively treat major psychiatric disorders, engage social services to resolve social problems in patients with a history of suicidal behaviour, and reduce access to alcohol.⁴⁹ Similar strategies can be adopted to reduce DSH among Singaporean adolescents and young adults. Clinicians working in medical or surgical departments should routinely screen for suicidal plans in patients presenting with DSH. As prior studies have found that young adults prefer internet-based psychological interventions and the efficacy for these interventions are comparable to face-to-face interventions, future research should explore the use of this mode of delivery to reduce DSH among Singaporean adolescents and young adults.^{50,51}

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