

ORIGINAL ARTICLE

**IDENTIFYING THE PATTERNS OF SELF-HARM  
AND SUICIDE ATTEMPTS IN CHILDREN  
AND ADOLESCENTS IN SINGAPORE**

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**Abstract**

**Objective:** In the past decade, self-harm and suicidal behaviours in adolescents have increased with teen suicides in Singapore reaching a record high in 2015. Globally, completed suicide is reported to be second leading cause of death in this demographic. This study aims to explore the methods of self-harm and suicide attempts employed by young people who are admitted to a tertiary paediatric hospital in Singapore. **Methods:** A cross-sectional retrospective medical record review was conducted for a 3-year period from 2012 to 2014. All patients admitted with self-harm or suicide attempts and referred for inpatient consultation were included in the study. Data was collected on the following: age, gender, race, if the attempt was a suicide attempt or self-harm, and method used. **Results:** A total of 106 cases were referred for self-harm or suicide attempt; 15 of these cases were male patients and 91 were female patients. A total of 47% were categorized as self-harm, and 41% for the suicide attempt. In another 5%, the intention was recorded as ambivalent, and 7% cited other reasons. The 3 most common methods were drug ingestion (63%), self-cutting (18%) and chemical ingestion (12%). Results show that drug ingestion remains the preferred method, even after stratification according to gender, age and intention. Paracetamol was the most common drug ingested. **Conclusion:** Drug ingestion is the main choice for our youth when it comes to self-harm or attempting suicide. This could likely be due to the easy access of medications. Further studies can be done to determine how and where these medications were obtained. This could help explore areas for improvement when it comes to safe storage of medicine at home, disposing of expired medicines and drug regulations in terms of sale of medicines to minors over the counter. *ASEAN Journal of Psychiatry, Vol. 18 (2): July – December 2017: XX XX.*

**Keywords:** Self-Harm, Suicide, Children, Adolescents, Asia, Singapore

**Introduction**

A suicide attempt can be defined as a “self-destructive behaviour performed with the intent to end one's life independent of the resulting damage” [1, 2] whilst, deliberate

self-harm (DSH) is defined as the “deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g., scarring) to occur” [3]. A key difference

between DSH and a suicide attempt is the intent to end one's life.

For the past few decades, the pace at which youths engage in suicidal behaviour and DSH has increased. Globally, suicide is now the second leading cause of death among 15-29 year olds [4] while DSH practices have become more ubiquitous among the young [5]. Large scale community studies suggest estimated DSH rates of 1.8% [6] to 17.0% in different international populations [7].

While rare in children less than 10 years of age [8], the existence of suicidal behaviours among the young is not new. The rise in its prominence and prevalence, however, is alarming. In the United States, where suicide has surged to a 30-year high, the number of individuals aged 15-24 committing suicide has increased steadily since the low of 1999, with a three-fold increase among girls aged 10-14 [9]. This phenomenon is not isolated to the West. Over in Asia, Korea and Japan have likewise experienced a surge in the volume of completed suicides and suicide attempts among their youth [10, 11]. Between 2001 and 2011, a 74.9% increase in the number of suicides [12] among adolescents in Korea was noted. In any given year, there are more suicide attempts than there are suicide deaths. There is presently a marked difference in completed suicide methods observed in Western and Asian countries. For instance, the use of firearms is a favoured method of completed suicide in many Western countries, but not in Asia where self-poisoning and hanging currently predominate [13, 14]. However it is worth noting that there is often little overlap between the methods used by suicide attempters and completers [15].

In Western countries, unsuccessful suicide attempts are commonly made by self-poisoning with medication such as analgesics, tranquillisers and antidepressants [15-18]. Within Asia, countries vary greatly in terms of religious, social-cultural, economic and legal backgrounds [19], influencing the leading method in attempted suicide across all age demographics. In developing Asian countries, particularly the rural areas, toxic agricultural poisons are widely available and hence employed [20]. In contrast, suicide attempts in developed Asian countries mirror that of in the

West, with drug overdose being the method of choice [21-23].

The suicide rate of the general population in Singapore has remained relatively stable at 9.8 to 13 per 100,000 over the last 5 decades [24]. However, the most recent data shows a doubling (27 completed suicides in 2015 as compared to 13 in 2014) in the number of completed suicides in young people aged 10-19 years old [25, 26]. It is unclear if this increase is an aberration or if there are significant changes in the overall mental health of young people. In addition, there is no recent study to explore suicide attempts in Singapore. A study published in 1999 using data from 1991-1995 and conducted on Singaporean youths, found drug overdoses as the prevailing method of attempted suicide [21]. Analgesics, specifically paracetamol, and benzodiazepines were the most common groups of medicines used by both genders in suicide attempts then. In the domain of deliberate self-harm, no large scale study has been conducted on the methods commonly used in Singapore. A 2014 Singaporean study of 30 participants from Child Guidance Clinic who engaged in DSH, however, found self-hitting (70%) occurred the most frequently, followed by cutting/carving skin (66.7%) and biting self (56.7%). A large number used more than one form of DSH [27].

As suicide attempts and DSH are frequently unplanned, there is a great tendency for accessibility to dictate the method used to accomplish the act. Current methods in use hence provide an indication of and are influenced by the availability of methods, in particular, the availability of technical means within the country [4, 13, 28]. In a local setting, it would be important to explore how these methods have evolved 20 years since this was last explored. The recent emergence of the internet and social media as major sources of information and communication may have some bearing on the methods chosen. It has been noted that the Internet has made it easier for both detailed information on suicide methods to be obtained [29].

Restricting access to such means is a feasible way to reduce the incidence of youth suicide [30]. This study aims to provide an up to date exploration of the methods used in suicide

attempts and DSH so as to best inform clinicians, healthcare professionals and parents so that they can safeguard and restrict the availability of these methods.

## Methods

The Kandang Kerbau Women's and Children's Hospital (KKH) is located in the central area of the city state and is one of two government restructured hospitals that provides emergency paediatric care to children and adolescents. Children and adolescents who present with self-harm and suicide attempt are assessed at the Children's Emergency Department. Young people requiring medical intervention or observation are admitted to the paediatric wards of the hospital. The Child and Adolescent Mental Wellness Service (CAMWS) is a paediatric liaison psychiatry service that is staffed by psychiatrists and psychiatric case managers. One of the major roles of this team is to provide mental health assessments for young people admitted as an inpatient who have attempted suicide or self-harmed.

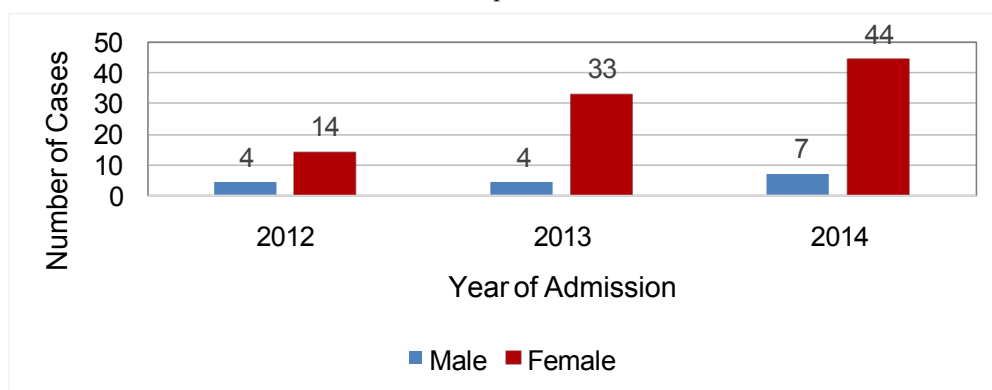
This study is based on a retrospective review of medical records of individuals admitted to the Paediatric wards at KKH. The period of study is a 3 year period between January 2012 and December 2014. The inclusion criteria for the study was that the young person was referred for inpatient psychiatric consultation and had either self-harmed or attempted

suicide. There were no exclusion criteria. The local ethics board was consulted and it was deemed that ethical approval was not required for the data set was to be attained retrospectively from medical records and no patient identifiers would be used.

The research team utilised an existing database to identify cases that met criteria for this study. After identifying appropriate patients, medical case notes were reviewed to extract the necessary data. A data collection form was used to collect data on: age, gender, race, diagnosis, if the attempt was a suicide attempt or self-harm, the method of self-harm or suicide attempt, type of medication, and quantity of medication taken if the method was an overdose. Additional demographic information was not collected. All data was anonymised and no contact was made, either in person or telephone, with the patient or the caregivers during the study. The data was analysed using Microsoft excel.

## Results

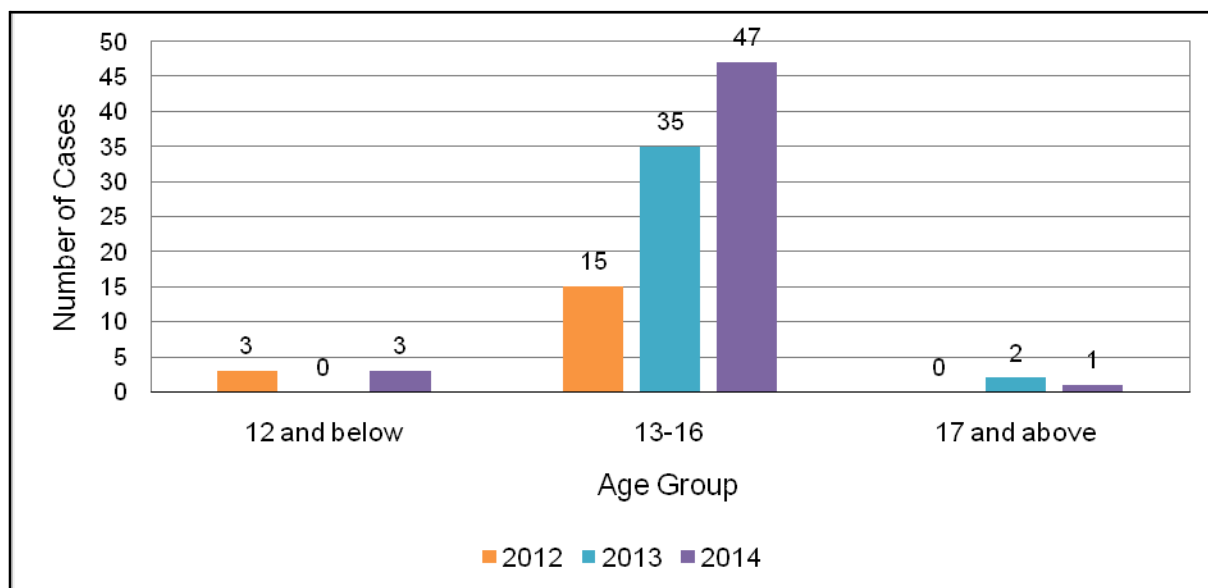
Between 2012 and 2014, a total of 106 cases of deliberate self-harm and attempted suicides among individuals aged 11-17 were referred for assessment. Of the 106 individuals, 15 were male and 91 were female. Over the three-year study period, there was a 2.8-fold increase in the number of cases. This was accompanied by a rise in the female to male ratio from 3.5:1 in 2012 to 6.29:1 in 2014.



**Figure 1. Number of Cases by Year of Admission**

Of the three age groups, those aged 13-16 accounted for the majority of the cases, with a relatively lower incidence of self-harm and attempted suicides among those at both age extremes (Figure 2). Additionally, an upward trend in cases was observed in the 13-16 age

group. Over the three year study period, 6 of those referred were aged 12 and below, 97 were between the ages of 13 and 16 and 3 were aged 17 and above. The average age of the individuals admitted was determined to be 14, 15 and 14 in 2012, 2013 and 2014 respectively.



**Figure 2. Number of Cases by Age between 2012-2014**

The majority of people who attempted suicide or self-harmed were Chinese (54 individuals, 50.9%), followed by Malays (24 individuals, 22.6%), Indians (17 individuals, 16.0%) and others (11 individuals, 10.4%). After psychiatric assessments, 47.2% of the 106 cases were concluded as DSH and 41.5% were suicide attempts. As category distinct from attempted suicide and DSH, ambivalence (4.7%) was noted less frequently. Others (5.7%) reported being unsure of the reason behind their act, doing what they did as a means to a specific end (ie: missing an examination), being curious, while another did not want to specify a reason. Among the methods employed for the above intentions, drug overdose (63.2%) was the most common, followed by self-cutting (17.9%) and chemical ingestion (12.3%) involving household cleaning agents and toiletries. Self-hitting (3.8%) and jumping from a height (1.9%) were also featured, albeit less frequently. While one method was used in most cases, two individuals relied on more than one. There was no association between the underlying intention and the method used.

Of the group who overdosed on medications, analgesics were the most common class of medications ingested (65.7%). Other frequently used medications include antihistamines (20.9%) and selective serotonin reuptake inhibitors (SSRI) (16.4%). Notably,

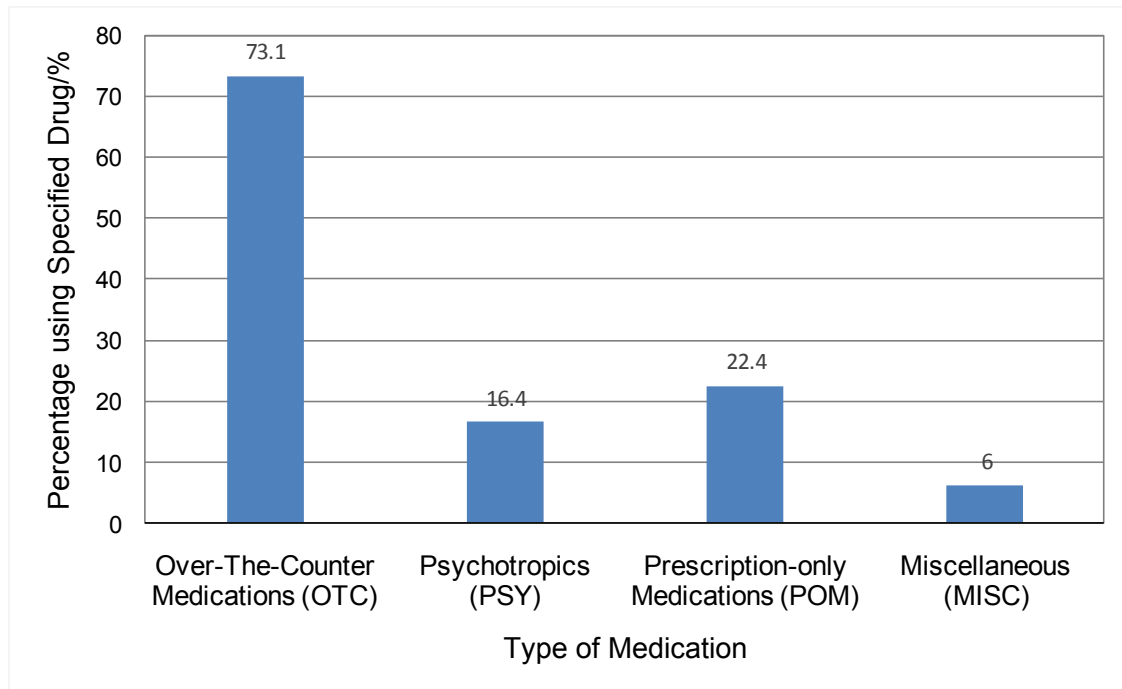
of all the named medications, Paracetamol was the single most used drug, featuring in 62.7% of all cases and accounting for 93.2% of all analgesic use. Paracetamol was ingested in both 500mg tablet and suspension forms. The concentration of Paracetamol taken in suspension form was not specified and is assumed to be 250 mg/5 ml. After adjusting for dosage, the number of 500mg Paracetamol tablets taken by individuals ranged between 1.5 to 40, with an average of 16 consumed. 18 individuals used more than one class of medications. It was observed that in suicide attempts and DSH, drug ingestion was the primary method chosen by individuals of both genders.

There was a clear preference for the use of over-the-counter medications (OTC) (73.1%), consisting of analgesics and antihistamines, among other medications in the 67 overdoses (Figure 3). Paracetamol consumption, in particular, made up 70% of OTC ingestion, either on its own or together with other medications. The medical records reviewed did not indicate if Paracetamol was obtained over the counter or via a prescription; it is categorised as an OTC medication in all instances of its use in this study. The classes of OTC medications taken included analgesics, antihistamines, antitussives, antispasmodics, anti-inflammatories and antiemetics. Similar classes of drugs categorised as prescription-

only medications (POM) were used, with the exception of the ingestion of a beta-blocker by an individual. Overall, OTC medications were used the most widely in all 3 years with Paracetamol consumption averaging 82.7% of all cases where at least one OTC medication was ingested. This trend holds true across all ethnic groups, ages and intentions behind the

act of overdosing on drugs.

After a diagnosis was made in each case and tallied, it emerged that there was a high incidence of stress-related disorders (45.9%) and depression (35.1%). Eating disorders were diagnosed in 5.4%.



**Figure 3. Types of Medications Used by the 67 Individuals**

## Discussion

How are things different or the same from 20 years ago?

The findings from this study mirror that of other published reports in certain aspects. Females were more likely to engage in deliberate self-harm (DSH) or attempt suicide than males and drug overdose remained the most widely employed method, with analgesics featuring most commonly.

Of the age groups, suicide attempts and DSH were observed to be more common in individuals aged 13-16. Few individuals were aged 12 and below. Whether the lower rates of DSH and suicide among young children are attributable to the lack of motivation to take one's own life due to an inability to conceptualize death as irreversible

nonexistence [31] is disputable, however, it is likely that under-reporting occurs, to a certain extent, as attempts by children are frequently mistaken to be accidents at first glance [32, 33] and self-harm can be missed by carers. It has been noted in previous studies that rates of completed and attempted suicide generally increase with age [34-36]. In our study, cases involving individuals aged 17 and above featured less as KKH Children's Emergency Department (ED) does not routinely see patients above 16. However, there are exceptions in instances whereby the individual has prior medical records in the hospital or has just turned 17.

The racial profile of the presenting cases deviated from that of the general population. Chinese individuals made up the majority of cases but were underrepresented in the data while Malays and Indians were

overrepresented in relation to their proportion in the general population.

Traditionally, Malays have always had the lowest suicide rate in Singapore [24, 37]. The religion of Islam, to which most of them identify with, regards suicide as a cardinal sin and this has effectively served as a deterrent. Other protective features among Malays include a close-knit community and a less aggressive approach to material pursuits [38]. However it is still possible that the growing secularism that is associated with modernisation and exposure to more liberal lifestyles may serve to attenuate the protective factor of religion in the coming decades. A reluctance to be seen as mentally ill could have kept reported rates of suicide attempts and DSH deceptively low in the past. A possible rise in acceptance of mental illness within the Malay community, following a trend observed in the general population, may have served to reveal a more precise level of suicide attempts and DSH, accounting for any increases.

Indians have consistently appeared to be more at risk of suicide and DSH [8, 21, 39]. This has often been ascribed to the more tolerant view the Hindu religion has of suicide [40] and the presence of stressors in the form of cultural expectations of the individual to subordinate his personal wishes to the interests of the family. In females, this takes the form of arranged marriages and the fostering of a subservient disposition towards men. However, no local study seeking to account for this phenomenon has been conducted thus far and further research is required to determine if the above factors are generalisable to Singaporean Indians. The presence of a mental disorder, which may arise due to sociocultural stressors, is also an important risk factor for suicide. Generally, over 90% of those who commit suicide have a psychiatric diagnosis at the time of death. In Singapore, a 2012 population survey found that Indians had the highest lifetime risk of being afflicted with at least one mental disorder among all the races [41], possibly accounting for higher suicide rates.

In this study, the number of individuals who attempted suicide or engaged in DSH occurred in roughly the same proportion. However, it is

unlikely that this is a true reflection of the prevalence of such behaviours, especially DSH. DSH usually serves as a coping mechanism and is done without suicidal intent. Decidedly less lethal methods which inflict little actual harm, such as self-cutting, are hence frequently used. These cases often do not present to emergency departments, with only 5% of college students reporting ever seeking medical treatment for the injuries caused in a 2011 American study [42]. In instances where medical treatment was obtained, numerous cases may have just warranted outpatient care and would not have been included in this study. In addition, the methods of DSH can be broadly categorised into that of self-injury and self-poisoning. Individuals who self-poison are more likely to seek help [43] and it is estimated that 90% of cases referred to a hospital following self-harm were people who self-poisoned [44]. Correspondingly, 80% of people who present to the emergency department after self-harming would have taken an overdose of over-the-counter or prescription-only medications [45]. Indeed, this study has found drug overdose to be the most common method of DSH or attempted suicide among those presenting to the ED.

Ambivalence, where there are mixture of wishes to end life and to live on, is typical of the suicide process [46], was recorded in fewer cases than expected. This might be due to difficulties in attaining this information clearly from the medical notes. An ambivalent intention may be described in the form of a recording of various thoughts and events in the medical notes. However, there was frequently no clear mention of the term “ambivalent intention” for the research team to take note of. An ambivalent intent, with competing wishes to die and to live, is important to note especially when formulating suicide and self-harm prevention policies. Ambivalence underpins the majority of unplanned suicide attempts or self-harming behaviour; it follows that premeditation is usually absent in adolescent suicides and that the methods used are those that are most readily available. A preference for the most accessible means of suicide, coupled with the fact that most suicidal crises are short-lived, would imply that by restricting access to these methods, overall suicides rates should decrease without

a concomitant increase in the use of other means [46].

Of all the drugs used, paracetamol emerged as the most popular. This study also found that the majority of medications used in overdoses could be obtained over the counter. Availability rather than perceived lethality seemed to dictate the choice of medication. Analgesics were the most common class of medications used, followed by antihistamines. This is a departure from that of found in the 1999 study on suicidal behaviour among young people in Singapore [21]. Benzodiazepines were the second most used drug then. In this study only two individuals were found to have overdosed on them. This could be explained by a change in prescription patterns. The issue of the over prescription of benzodiazepines by primary care physicians has been highlighted in the past [47] leading to the introduction of clinical practice guidelines on the prescription of benzodiazepines by the Ministry of Health in 2008. Consequently, as more caution when dispensing such medication has been advised, there could have been a possible decrease in its availability and hence, use in DSH or suicide attempts.

Unfortunately, a similar fall in the use of analgesics in drug overdoses has not materialised despite its long-held notoriety as the leading class of drug used in DSH and suicide attempts over the years [48-50]. It remains that they are easily available, commonly prescribed and can be purchased without a prescription. In view of this, there have been calls to curtail the availability of such medications, in particular, paracetamol. In overdoses, paracetamol is known to cause mild to severe hepatic damage leading to acute liver failure and death despite the availability of an antidote therapy.

DSH and suicide attempts made by an overdose on paracetamol are not isolated to Singapore. This problem has long plagued countries such as the United Kingdom (UK) which has since legislated a limit on the size of packs of paracetamol, among other analgesics, sold at pharmacies and other retail outlets. Previously unrestricted sale limits were reduced to 32 tablets for pharmacies and 16 tablets for non-pharmacy outlets in an attempt to trim household stocks and overdoses

associated with these supplies [51-53]. Naturally, this was met with scepticism as there were concerns about a displacement effect where restricted drugs were simply substituted with other types of drugs. Early data, however, did show that little substitution to other kinds of analgesics such as ibuprofen occurred [54]. In the years since the 1998 bill, there have been follow-up studies with conflicting results on the effectiveness of the legislation. While some studies have reported drops in overdoses involving paracetamol [55], others have cast doubt on such findings [56]. It remains unclear if the inability to obtain unequivocal findings of the law's effects is due to the short follow up periods of the studies and the restriction of their data to small geographical areas [57]. Promisingly, one of the first studies examining the long-term effects of the law has found a 43% decrease in the number of poisoning deaths and a 61% fall in the number of people requiring liver transplants which were made necessary due to liver failure associated with hepatotoxicity arising from paracetamol overdoses [58].

#### ***Efforts to reduce DSH and suicide attempts***

When it comes to suicide prevention, it is generally recognised that suicidal crises are usually of a short duration and are preceded by little to no planning. It is posited that a restriction might bring about a longer delay between the suicidal thought and the actual attempt by making it more cumbersome for an individual to obtain all the necessary material to commit the fatal act, allowing a period of high risk to pass without complications [59]. At worst, when method substitution does occur, reduced access to lethal means could mean that more people survive an attempt because of their use of alternative and possibly, less deadly methods [46].

It is critical to recognise that means restriction alone should not be seen as a panacea to alleviating the problem of youth suicides and deliberate self-harm. In addition to good enforcement, it has to be accompanied by education regarding the safe storage and disposal of medications or toxic chemicals and extra caution on the part of healthcare professionals when prescribing medications to vulnerable individuals. All in all, effective

suicide and DSH prevention necessitates the presence of a vigilant family, a cooperative patient and alert healthcare providers.

It has been said that DSH and suicide attempts among adolescents are less of a function of psychopathology and intent and more of a matter of easy access to means and impulsiveness. The high prevalence of stress-related disorders among the young people in this study and their use of easily obtainable, over-the-counter medication are perhaps a reflection of the above statement. This suggests a need to go beyond the restriction of means, to address the poor coping strategies that these at-risk individuals possess.

While dismissively, and falsely, labelled as 'attention seeking', DSH is in fact a coping mechanism [60], taking away the means to do it does not solve the underlying emotional distress that predates it. The same can be said about suicide. It may be inevitable that some degree of method substitution may occur, but the multifaceted nature of DSH and suicide makes it impractical to rely on a single mitigation method. Multilevel intervention, ranging from the level of the community to clinical services, is warranted.

The role of specialty mental health care providers in managing those seemingly predisposed to suicidal behaviour and DSH is extensively covered in research but for primary healthcare providers this is less so. Undoubtedly, as general practitioners, among all healthcare professionals, are most likely to have been visited by individuals in the period leading up to DSH or suicidal behaviour, they play a decisive role in the prevention of suicide and aftercare of DSH patients [61]. In addition, a suicidal individual's access to a lethal dose of prescription-based medications is very much linked to prescription attitudes among primary care physicians. Prudence in the prescription of drugs, that would include prescribing the minimum effective dose on a more frequent basis, has to be emphasized as the majority of those who self-poison use the, often, excessive amount of medication prescribed to them [62].

### **Limitations**

As this is a study on inpatient cases seen at a single hospital, it does not provide a wholly accurate representation of the pervasiveness and characteristics of suicide attempts and DSH among young people in the community. It was observed that drug ingestion occurred most frequently but such a presentation could be related to the potential lethality of method used rather than true incidence. A study of emergency department presentations may provide a more comprehensive picture of the rates of such acts and the methods used to accomplish them, although the findings would likely reflect methods arising from the more severe end of the spectrum of self-harming behaviour. Our sample is further limited to the individuals who actually presented to services; Studies have found that a significant proportion of young people who self-harm or attempt suicide do not seek medical help [63, 64]. While rarely done, community studies involving schools and self-reporting are valuable in determining the true prevalence of suicidal behaviour and DSH among youths. As DSH is often done in secret [65], hospital samples tend to underestimate its rates when compared with that of determined by community samples [43, 66].

A prospective study should be conducted in the future to better ascertain the motivation behind acts of DSH or suicide attempts, risk factors and the rate of repetition. This would aid in the early identification of at-risk individuals and prevent more engaging in DSH from regressing to a point where taking one's life appears to be the only viable option. Additionally, to plan services aimed at reducing the suicide rate, an estimate of the link between DSH and suicidal behaviour should be made given the strong association between the two [67, 68].

### **Conclusion**

Our study has documented an increase in the rates of suicide attempts and DSH among adolescents, with differences in age, gender and racial distributions. Females, adolescents, and Malays and Indians appear to be more at risk. There was an overall preference for drug overdose as a method of DSH and suicide attempts, mirroring that of trends in the past locally and internationally.



In conclusion, the observed pattern of DSH and suicide attempts is very likely dictated by the easy access to medications. Curtailing the rising rates of DSH and attempted suicides would include, primarily, lowered access to means accompanied by culturally relevant anti-stigma campaigns, public education and a heightened awareness of any unusual changes in the behaviour of the adolescent. Further studies seeking an improvement in the storage of medicines at home and regulations in the sale of over-the-counter medications to minors can be done to tackle this problem. From our study, stress-related disorders were associated most frequently with the decision to self-harm or attempt suicide. In light of this, it would seem that finding healthier avenues and strategies to deal with stress, and interpersonal skills training have to be explored in conjunction with the removal of means. Potential triggers for DSH and attempted suicide in young people in Singapore should also be looked into.

#### **Conflict of Interest**

The authors declare that there are no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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