ความชุกของการจงใจทำร้ายตนเองในวัยรุ่นไทยและปัจจัยที่เกี่ยวข้อง: การประยุกต์ใช้สำหรับผู้เฝ้าระวัง

Prevalence of Deliberate Self-harm among Thai Adolescents and Associated Factors: Implications for Gatekeepers

นิพนธ์ต้นฉบับ

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Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความชุกและความสัมพันธ์ระหว่างปัจจัยลักษณะส่วนบุคคล และครอบครัวที่เกี่ยวข้องกับการจงใจทำร้ายตนเองในวัยรุ่นไทย **วิธีการศึกษา:** เป็นการศึกษาแบบภาคตัดขวาง กลุ่มตัวอย่างคือ เยาวชนชาวไทย 360 คนที่อายุ 15 - 19 ปี เพื่อกรอกแบบสอบถามแบบไม่เปิดเผยตัวตน โดยใช้การสุ่มตัวอย่างแบบหลายขั้นตอนเพื่อคัดเลือกผู้เข้าร่วมที่ศึกษาในโรงเรียนมัธยมในภาคเหนือของประเทศไทย รวบรวมข้อมูลในช่วงกรกฎาคม 2562 ถึงมกราคม 2563 ประเมินการจงใจทำร้ายตนเองโดยใช้แบบสอบถาม Deliberate Self-Harm Inventory-10-Item Version Revised (DSHI-9r) ทดสอบความสัมพันธ์ด้วยการทดสอบการถดถอยโลจิสติก **ผลการศึกษา:** พบว่าอัตราความชุกของพฤติกรรมการจงใจทำร้ายตนเองในวัยรุ่นไทยอยู่ที่ 91.7% โดยส่วนใหญ่วัยรุ่นชายและวัยรุ่นในชั้นมัธยมศึกษาปีที่ 4 มีแนวโน้มพฤติกรรมการจงใจทำร้ายตนเอง (*P*-value < 0.05 for both) และพบว่าวัยรุ่นที่พ่อแม่ไม่อยู่ด้วยกันและที่รายได้ครอบครัวไม่เพียงพอก็มีแนวโน้มพฤติกรรมการจงใจทำร้ายตนเองเช่นกัน (*P*-value < 0.05 for both) **สรุป:** ความชุกของการจงใจทำร้ายตนเองในวัยรุ่นไทยสูงสูงมาก และสัมพันธ์กับเพศชาย, เรียนในชั้นปีต้น, พ่อแม่ไม่อยู่ด้วยกัน และรายได้ครอบครัวไม่เพียงพอ

คำสำคัญ: วัยรุ่น, การจงใจทำร้ายตนเอง, ระดับชั้น, สถานภาพสมรสของพ่อแม่, รายได้ครอบครัวพอเพียง

Abstract

Objective: To determine the prevalence and explore associated socio-demographic factors that predicted deliberate self-harm (DSH) among Thai adolescents. **Methods:** We recruited 360 adolescents aged 15 - 19 years old to complete an anonymous self- report questionnaire. A multi- stage random sampling was used to recruit participants who studied in high schools in northern Thailand. Data collection for the cross-sectional study was carried out from July 2019 to January 2020. DSH was measured using the Deliberate Self-Harm Inventory-10-Item Version Revised (DSHI-9r). Logistic regression was conducted to test the associations. **Results:** The results revealed a 91.7% prevalence rate of DSH behaviours among the Thai adolescents. Being male, studying in Mathayom 4 (i.e., grade 10), parents not living together, and having insufficient household income were more likely to have DSH (*P*-value < 0.05 for both). **Conclusion:** The prevalence of DSH among Thai adolescents was high and it was associated with being male, lower academic year, having parents not living together, and having insufficient household income.

Keywords: adolescents, deliberate self-harm, grade level, parents' marital status, sufficiency of household income

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Introduction

Healthcare professionals and secondary school educators are increasingly concerned about self-harm behaviours among adolescents with whom they interact. Deliberate self- harm (DSH) is a purposeful act directed toward the self, causing physical injury. Its motivation is not necessarily about suicide, although there can be a behavioural link between suicidal ideation and self- injury.[1] The act of non- suicidal self- injury among adolescents may take multiple forms including self-mutilation, self- wounding, self- cutting, self- poisoning with various drugs, repetitive self- injurious behaviours (hair pulling and head banging), or self-punishment (beating).[2] DSH can be a singular incident but when manifesting itself more than five times over a defined time period, it is called repetitive, deliberate self- harm behaviour.[3] The prevalence rate of DSH varies depending on the method of assessing its history and the population being assessed. Age and sex of the adolescent influence the rate of DSH. A study of English adolescents between 12 and 17 years of age found that 46.6% had engaged in self- harm in the prior 12 months.[4] Although Law and Shek reported a higher rate of DSH among female adolescents,[5] Bennardi et al found that male adolescents in the 20 - 24 years age range had a higher rate of DSH.

Generally, researchers ask a single item question to assess whether a participant has engaged in DSH,[6] and this is often followed up with questions on the method of DSH and a description of the event.[3]

Adolescents and their families suffer physiological/ psychological distress and social problems from the consequences of DSH. Scars and wounds may result from physical self-harm, especially with a lack of medical treatment and self-care.[7,8] Emotional distress from trying to cope with unresolved problems may induce repetitive DSH or addictive self-harm behaviours that become a risk factor for suicidal ideation.[9] The effects of social contagion may become a risk factor for suicidal ideation, parasuicide or copycat, and more seriously, attempted suicide in early adulthood. Affected families experience stigmatization or even familicide. In addition, DSH-related treatment costs can lead to a substantial financial burden.[7,9]

Researchers have theorized why adolescents engage in self-harm behaviour. Early perspectives suggested that self-harm creates boundaries between the self and others to externalize and control emotions or to punish one's self.[10,11] Interpersonal influence in self-harm is also important.[10] Not only do these perspectives fall short in addressing the multiple reasons why an individual might engage in DSH, but they also lack strong empirical support. The development of an evidence-based, functional model of DSH or non-suicidal self-injury is desirable. Functional approaches propose that behaviours are largely controlled by events that immediately precede and follow them (i.e., antecedents and consequences).

The most widely studied functional model is the Four-Function Model of Non-Suicidal Self-injury. Developed by Izadi-Mazidi et al,[12] the Four-Function Model delineates specific reinforcement processes that influence non-suicidal self-harm including 1) Internal negative reinforcement, 2) internal positive reinforcement, 3) external negative reinforcement, and 4) external positive reinforcement. It was derived by examining the functions of self-harm behaviour among individuals with developmental disabilities. The model classifies self-injury according to its antecedents and consequences, integrating automatic and social reinforcement.[12,13] Intrapersonal elements are factors that occur in the early lifespan and directly affect personal expression, such as birth orders, number of siblings, and sex. Extrapersonal elements are factors that occur as adolescents' growth and live in their environment and society. They affect thoughts, emotions, and behaviours in daily life, such as types of schools, parents' marital status, grade point average (GPA), grade level, average monthly household income, and sufficiency of income.[13]

Parents' marital status and poor communication with parents have been related to poor family relationship and DSH.[14] Adolescents with greater physiological hyperarousal from stress are more likely to engage in DSH because stress influences grade point average.[15] Birth orders, number of siblings, and types of schools adolescents attend are components of internal and external positive reinforcement that impact cognitive-behaviour levels of DSH.[6,12,14] Also affecting cognitive behaviour levels as components of internal and external negative reinforcement are sex, average monthly household income, and sufficiency of income.[12,13]

Few risk factors for DSH have been reported for Thai adolescents. Research on DSH among Thai adolescents has focused mostly on clinical populations with mental health disorders. The study on prevalence of DSH among Thai adolescents in high school-based populations has also limited. This led the research questions, specifically (1) what the prevalence rate of deliberate self-harm behaviour among Thai adolescents was, and (2) whether socio-demographic factors (sex, grade level, parents' marital status, sufficiency of income, birth order, number of siblings, GPA, type of school and average monthly household income) could predict deliberate self-harm behaviours among Thai adolescents.

Therefore, the aims of this study were 1) to determine the prevalence of deliberate self-harm behaviours among Thai adolescents, and 2) to explore the socio-demographic factors that best predict deliberate self-harm behaviours among Thai adolescents. We hypothesized that the following reinforcement factors would predict deliberate self-harm (DSH) among Thai adolescents: 1) birth order and the number of siblings would be internal positive reinforcement factors; 2) sex would be an internal negative reinforcement factor; 3) types of schools and parents' marital status would be external positive reinforcement factors; and 4) GPA, grade level, average monthly household income, and sufficiency of income would be external negative reinforcement factors.

Methods

A predictive correlational design study was conducted to determine the prevalence and explore which of nine socio-

demographic factors best predicted DSH behaviour among Thai adolescents.

We recruited 360 Thai adolescents who were studying in either a large public or private secondary school in Mathayom 4 – 6 (senior high school level) in a northern province of Thailand from July 2019 to January 2020. Eligibility criteria were that the adolescents were between 15 and 19 years old, could read and write in Thai language, had not been diagnosed by a psychiatrist/psychologist with a mental health problem, and received parental consent to participate.

G*Power (v3.1.9.2) was used to calculate the minimum number of participants. Sample size calculation was based on logistic regression. With a type I error of 5% and a 95% power, a total of 326 participants were needed. To compensate for a 10% drop-out rate,[16] we recruited a total of 360 participants. A multi-stage random sampling technique was used to select participants. First, a province in northern Thailand was selected by convenience sampling. A cluster sampling was used to select two public and five private secondary schools. One public and one private were selected by random sampling. Lastly, 360 participants were selected from each school (180 participants each) using simple random sampling.[16]

Research instruments

Participants completed a 9-item demographic questionnaire to collect information about their sex, grade level, grade point average (GPA), type of school, parent's marital status, birth order, number of siblings, average monthly household income, and sufficiency of income. Developed by Lundh et al,[3] the Deliberate Self-Harm Inventory-10-Item Version Revised (DSHI-9r) has responders indicate if they have purposively engaged during the past six months in any of 10 behaviours of direct physical self-harm, such as cutting wrists, arms, or body areas, burning oneself with cigarette or lighter, sticking sharp objects into the skin, biting oneself, punching oneself or banging one's head. They rate the frequency of each behaviour using six numerical options ranging from 1 "never" to 6 "more than five times" during the time period. Summed scores can range from 0 to 60 points with higher scores indicating more severe deliberate self-harming behaviours and a greater likelihood to engage in suicidal ideation. Prevalence of DHS is defined as having at least one incident of reported DHS. The Cronbach's alpha coefficient for internal consistency reliability for our sample was 0.83.

To ensure the instruments' content validity and cultural equivalence, the original English version of the DSHI-9r was translated into Thai using a back translation technique.[17] A panel of five experts verifying the translation accuracy and content validity consisted of one psychiatrist, three mental health nursing instructors, and one native bi-lingual Thai speaker working as a nursing instructor in the United States. Construct validity of each scale was tested using confirmatory factor analysis and the single construct was statistically confirmed (Model fit statistics: χ^2= 27.557, df = 19, *P*-value = 0.092; CMIN/df = 1.450, GFI = 0.985, AGFI = 0.956, and RMSEA = 0.035).

Ethical consideration and Data collection procedures

The research proposal was approved by the ethical committee of the Faculty of Nursing, Burapha University (IRB no. 04-05-2562). After receiving permission from schools and primary teachers, the researcher contacts the primary teachers of each classroom to make appointment at the appropriate time or extra time without the impact on classroom time. Participants were requested to bring information sheet and consent form to their parents. The adolescents and parents signed the assent and informed consent forms, respectively.

Participants were informed of the study's purpose, that participation was voluntary, confidentiality would be maintained, and they could withdraw at any time. Written consent was obtained from each participant prior to data collation. Each participant took approximately 30 minutes to complete all questionnaires in a private room.

A separate room was provided in order that the regular classroom time was not affected while completing questionnaires. No participants' information was revealed but it was reported in the summarized finding for monitoring purpose. Nevertheless, when a high level of self-harm was found with a risk of suicidal ideation tendency, he/she would be transferred by the researcher to the classroom teacher, school's nurse, psychologist or relevant healthcare providers for further assistance.

Data analysis

Descriptive statistics were used to summarize the adolescents' demographic characteristics and the prevalence of deliberate self-harm. Pearson's chi-square test was used to test differences of DSH regarding various demographic

characteristics. Multiple logistic regression analysis was performed to predict adolescents' DSH. Adjusted odds ratio (adj. OR) with 95% confidence interval (CI) were reported. Statistical significance was set at a type I error of 5%. Data were analysed using the IBM® SPSS® version 26 statistical software.

Results

Of the total of 360 participants, proportions of male and female participants were approximately equal (49.4% and 50.6%, respectively) (Table 1). As senior high school students, their age range was limited from 15 to 19 years old with a mean of 16.4 years (*SD* = 0.91). They identified themselves as being the first and second child (46.9% and 53.1%, respectively. The majority reported having another sibling (58.6%). The overall GPA was 3.16 (SD = 0.56), ranging from 1.00 to 4.00. Two-thirds of the adolescents (67.5%) had a GPA above 3.00. Most adolescents had two siblings (58.6%) (i.e., 36.7% with GPA of 3.01 – 3.50 and 30.8% with 3.51 – 4.00. The majority reported their parents were married and lived together (70.8%) and they lived with their parents (70.8%). Majority of the adolescents reported their average monthly household income in the range of 10,000 - 20,000 Thai Baht (45.0%), followed by more than 20,000 Thai Baht (41.9%). Most had sufficient living expenses with savings (56.9%) but the other 39.4% had no savings despite sufficient living expense. (Table 1).

The prevalence of DSH behaviours among Thai adolescents was 91.7%, i.e., 330 of 360 participants reported experiencing at least one DSH in the past six months. The majority experienced DSH of 4, 5, 6, 7, 8 and 9 times (10.8%, 14.4%, 15.3%, 13.3%, 12.5% and 10.3%, respectively). On average, adolescents engaged in DSH behaviours 6.1 times (*SD* = 2.83) in the past six months, with a range of 3 - 14 times (Table 2).

The most frequently reported self-harm behaviour was "Bit yourself, to the extent that you broke the skin" with 262 adolescents reporting the behaviour at least once in the past six months. The least reported DSH was "Cut your wrist, arms, or other area(s) of your body" with 156 individuals reporting the behaviour (Table 3).

Table 1 Sociodemographic characteristics of the participants (N = 360).

Characteristics	N	%
Sex		
Male	178	49.4
Female	182	50.6
Age (yrs), mean = 16.42 ± 0.91, range = 15 - 19		
15	64	17.8
16	116	32.2
17	150	41.7
18	25	6.9
19	5	1.4
Birth order		
1 (first child)	169	46.9
≥ 2 (younger child)	191	53.1
Number of siblings		
0 (i.e., only child)	13	3.6
1	84	23.3
2	211	58.6
3	40	11.1
4	10	2.8
5	2	0.6
GPA, mean = 3.16 ± 0.56, range = 1.00-4.00		
1.00 – 2.00	25	6.9
2.01 – 2.50	29	8.1
2.51 – 3.00	63	17.5
3.01 – 3.50	132	36.7
3.51 – 4.00	111	30.8
Grade level (senior high school level)		
Mathayom 4	120	33.3
Mathayom 5	120	33.3
Mathayom 6	120	33.3
Type of school		
180	50.0	180
180	50.0	180
Parents' marital status		
Living together (married)	255	70.8
Not living together		
Divorced	56	15.6
Separated	32	8.9
Widow	17	4.7
Living arrangement with parents		
Living with parents	255	70.8
Not living with parents	105	29.2
Average monthly household income (Thai Baht)		
< 5,000	8	2.2
5,000 - 9,999	39	10.8
10,000 – 20,000	162	45.0
20,000 or higher	151	41.9
Sufficiency of income		
Yes	347	96.3
With savings	205	56.9
Without savings	142	39.4
No	13	3.6

Table 2 Number of times with DSH behaviors (N = 360).

Frequency of DSH	n	%
3 times	21	5.8
4 times	39	10.8
5 times	52	14.4
6 times	55	15.3
7 times	48	13.3
8 times	45	12.5
9 times	37	10.3
10 times	12	3.3
11 times	13	3.6
12 times	7	1.9
14 times	1	0.3
At least 1 DSH	330	91.7
Mean ± *SD* = 6.1 ± 2.83		

Table 3 Frequencies of deliberate self-harm behaviors by type (N = 360).

Item	Statement	DSH by number of DSH				
		Total	1	2	3	4
1	Bit yourself, to the extent that you broke the skin?	262	255	7		
2	Punched yourself, to the extent that you caused a bruise to appear?	241	203	38		
3	Stuck sharp objects such as needles, pins, staples, etc. into your skin? (tattoo, ear piercing, needles used for drug use, or body piercing are not included here)	235	230	5		
4	Banged your head against something, to the extent that you caused a bruise to appear?	231	222	9		
5	Prevented wounds from healing?	222	216	1	3	
6	Severely scratched yourself, to the extent that scaring or bleeding occurred?	201	193	8		
7	Carved words, pictures, designs, or other marks into your skin?	170	163	7		
8	Harmed yourself in any of the above-mentioned ways so that it resulted in hospitalization or injury severe enough to require medical treatment?	169	156	11	2	
9	Burned yourself with a cigarette, lighter, or match?	168	163	5		
10	Cut your wrist, arms, or other area(s) of your body?	156	136	3	17	

There were significantly more males than females engaging in DSH behaviours (94.9% and 88.5%, respectively, *P*-value = 0.009) (Table 4). The prevalence of DSH behaviours was considerably comparable and slightly decreasing from Mathayom 4 to 6 (96.7%, 90.8% and 87.5%, respectively) with statistical significance (*P*-value = 0.009). Adolescents whose parents lived together had less DSH (89.4%) than those whose parents did not (97.1%) with statistical significance (*P*-value = 0.016). Adolescents with sufficient household income with savings had less DSH (88.3%) than those with sufficient but without savings and those whose household income was not sufficient (96.1%) (*P*-value = 0.008). Prevalence of DSH was comparable with no statistical significance regarding differences in birth orders, number of siblings, GPA, types of schools, and average monthly household income (Table 4).

Results of multivariate logistic regression analysis (Table 5) were consistent with the previous univariate analysis (Table 4). Male adolescents were significantly more likely to engage DSH than females (adj. OR = 2.735, 95% CI = 1.154 – 6.485, *P*-value = 0.022). Adolescents in Mathayom 4 (grade 10) were significantly more likely to have DSH when compared with those in Mathayom 6 (grade 12) (adj. OR = 3.597, 95% CI = 1.145 – 11.304, *P*-value = 0.028). Adolescents whose parents did not live together had a significantly higher risk of than those whose parents did so (adj. OR = 3.499, 95% CI = 1.014 – 12.075, *P*-value = 0.048). Adolescents with sufficient but without savings and those whose household income was

Table 4 Comparisons of DSH behaviors by participant characteristics (N = 360).

Characteristics	Total (N = 360)		DSH behaviours				*P*-value*
			0 times (n = 30)		≥1 time (n = 330)		
	N	%	*n*	%	*n*	%	
Sex							0.009
Female	182	50.6	21	11.5	161	88.5	
Male	178	49.4	9	5.1	169	94.9	
Birth order							0.975
1 (first child)	169	46.9	14	8.3	155	91.7	
≥ 2 (younger child)	191	53.1	16	8.4	175	91.6	
Number of siblings							0.296
0 (i.e., only child)	13	3.6	2	15.4	11	84.6	
≥ 1	347	96.4	28	8.1	319	91.9	
GPA							0.476
≤ 3.00	117	32.5	8	6.8	109	93.2	
3.01 – 4.00	243	67.5	22	9.1	221	90.9	
Grade level (senior high school level)							0.009
Mathayom 4 (grade 10)	120	33.3	4	3.3	116	96.7	
Mathayom 5 (grade 11)	120	33.3	11	9.2	109	90.8	
Mathayom 6 (grade 12)	120	33.3	15	12.5	105	87.5	
Type of school							0.446
Public	180	50.0	9	5.0	171	95.0	
Private	180	50.0	21	11.7	159	88.3	
Parents' marital status							0.016
Living together (married)	255	70.8	27	10.6	228	89.4	
Not living together (divorced/ separated/widow)	105	29.2	3	2.9	102	97.1	
Average monthly household income (Baht)							0.318
≤ 20,000	209	58.1	20	9.6	189	90.4	
20,000 or higher	151	41.9	10	6.6	141	93.4	
Sufficiency of income							0.008
Sufficient with savings	205	56.9	24	11.7	181	88.3	
Sufficient without savings and not sufficient	155	43.1	6	3.9	149	96.1	

* Chi-square test.

Table 5 Associations of sociodemographic factors with deliberate self-harm (N = 360).

Factors	Adj. OR	95% C.I.		*P*-value*
		Lower	Upper	
Sex				
Female	Ref			
Male	2.735	1.154	6.485	0.022
Grade level (senior high school level)				
Mathayom 4 (grade 10)	3.597	1.145	11.304	0.028
Mathayom 5 (grade 11)	1.688	0.698	4.085	0.246
Mathayom 6 (grade 12)	Ref			
Parents' marital status				
Living together	Ref			
Not living together	3.499	1.014	12.075	0.048
Sufficiency of income				
Sufficient with savings	Ref			
Sufficient without savings and not sufficient	2.713	1.058	6.958	0.038
Birth order				
0 (i.e., only child)	Ref			
≥ 1	1.538	0.416	3.057	0.103
Number of siblings				
0 (i.e., only child)	Ref			
≥ 1	1.819	0.571	4.016	0.213
GPA				
≤ 3.00	1.624	0.498	4.125	0.241
3.01 - 4.00	Ref			
Type of school				
Public	1.786	0.652	3.987	0.109
Private	Ref			
Average monthly household income (Baht)				
≤ 20,000	Ref			
20,000 or higher	1.561	0.734	4.110	0.106

* Multiple logistic regression.

not sufficient were significantly more likely to have DSH than those with sufficient household income with savings (adj. OR = 2.713, 95% CI = 1.058 – 6.958, *P*-value = 0.038) (Table 5).

Discussions and Conclusion

This present study revealed a 91.7% prevalence rate of DSH which is higher than 35% – 55% reported in previous studies.[4,19] Although Saunders and Smith[20] and Geulayov et al reported high prevalence rates of 65% – 74%.[21] Their studies were conducted on people using hospital-based, healthcare services rather than a high school population. Liu and Mustanski reported a lower prevalence (15.4%).[22] It was derived from a single item computerized self-administered interview (ARBA), thus possibly underreporting the behaviour. Our finding yielded a prevalence rate of DSH of 91.7% in Thai adolescents. This seems to be a lot higher than other studies. It could be because, with the measure we used, one time of self-harm was identified as DSH. In the future, a comparison study of different kinds of DSH measures should be carried out.

For specific self-harm behaviours, our study revealed the ones similar to previous studies. These include scratching, cutting, punching or banging objects, punching or banging oneself, biting, ripping or tearing the skin, carving on the self, and burning with the conscious intention of self-injury.[7,8] There is little variation in studies in the methods that adolescents used when engaging in DSH behaviours.

Our findings only partially support the Four-Function Model of Non-Suicidal Self-injury.[12] The internal positive reinforcement factors of birth order and the number of siblings did not predict DSH in adolescents. Neither did the external positive reinforcement factor of types of school. However, sex (an internal negative reinforcement factor) and parents' marital status (an external positive reinforcement factor) predicted DSH. Of the possible external negative reinforcement factors, we found only grade level and sufficiency of income predicted adolescents' DSH. The factor with the highest weight for prediction was grade level, followed by parents' marital status, sex, and sufficiency of income.

Grade level is defined as an external negative reinforcement factor. We found that adolescents in Mathayom 4 (grade 10) were significantly more likely to have DSH when compared with those in Mathayom 6 (grade 12) (adj. OR = 3.597, 95% CI = 1.145 – 11.304, *P*-value = 0.028). Much of adolescents' lives are spent at school and with learning. School encompasses multiple aspects of their experiences such as academic, social, and safety-related.[23,24] As adolescents mature, they meet new teachers, find new friends, and confront different social expectations.[25] However, the Mathayom 4 can be the most challenging for many Thai students. It is a year when they are introduced to new academic subjects and learning programs. Although adolescents may adjust to their new study program, school stressors may create anxiety and stimulate DSH behaviour. Whether it is their striving for achievement or confronting failure, the adjustment for some adolescents is less smooth in how they meet academic performance standards. If there are cognitive difficulties or poor learning skills that are uncovered by enrolling in one program, students will need to shift to a new one. For example, the English science-mathematics program in Thailand's secondary education may not be a suitable academic fit for some adolescents, so they need to transfer to the less rigorous Thai science-mathematics program.

The social and cultural context of the Mathayom 4 (i.e., grade 10) can create a competitive lifestyle for adolescents and may cause negative social interaction patterns. For some, this experience may include being bullied, not getting along with teachers, feelings of not belonging, not doing well at school, feeling under pressure, being depressed, and having negative thoughts. These can be accentuated by shyness and anxiety when interacting with teachers and others. Bullying usually starts at 15 - 16 years of age or in the Mathayom 4. If bullying victimization is not solved, adolescents may resort to DSH behaviours in attempting to relieve stress.[26]

A lack of school friends, poor teacher support, bullying, and racism impact not only on adolescents' academic and vocational pathways but also affect their present and future mental health and well-being. Moreover, financial pressures for the Mathayom 4 students are higher because they are expected to purchase new student uniforms, books, and learning materials. For example, the learning materials of the English science-mathematic program are more expensive than Thai science-mathematic program. Adolescents from less affluent families may be bullied by other students if they cannot afford to buy the new learning materials.[27]

Adolescents who experience stress, anxiety, or depression, lack engagement in learning, or have poor relationships with peers and teachers are more likely to

engage in DSH behaviours.[15,28] These factors are associated with an increase in DSH and are the most frequently reported motives for DSH in adolescence.[8,9,19,29] Thus, Mathayom 4 grade can be a pivotal time for adolescents. They are affected by changes in their academic, physical, emotional, and social development, and may require help in adjusting to these changes to avoid DSH behaviour.[23,24]

Parents' marital status is defined as an external positive reinforcement factor. We found that adolescents who indicated their parents did not live together were more likely to engage DSH than other adolescents (adj. OR = 3.499, 95% CI = 1.014 – 12.075, *P*-value = 0.048). The parents' marital status may affect the adolescents' personality development and mental health. Although there are many exceptions, parents who live together create a potential for teaching how family members communicate effectively and support each other. In contrast, although again with many exceptions, a single parent may become overly protective and try to control every aspect of the adolescent's life. The child loses confidence and becomes emotionally dependent. When faced with their own difficulties, adolescents might experience stress that leads to self-harm as a tension reducing behaviour. Poor relationships can negatively affect every family member by creating family unhappiness, preventing unity, disrupting friendliness, causing social-familial distancing, and leading to family conflicts. The parents' marital status is important and should be considered when evaluating the context in which adolescents live.[30]

Being male is defined as an internal negative reinforcement factor. We found that male adolescents were significantly more likely to engage DSH than females (adj. OR = 2.735, 95% CI = 1.154 – 6.485, *P*-value = 0.022). Krishnakumar et al also found that the majority of adolescents in hospitals for treatment for DSH were males.[31] Müller et al not only reported a rise in prevalence of DSH in males in social settings but also found that male adolescents with a history of DSH began DSH behaviours at a younger age of DSH than females.[32] The hormonal changes of puberty make adolescents more vulnerable to emotional turmoil, and extreme negative emotions are associated with DSH.[6] Although we found the prevalence of DSH was higher in adolescent males, this is in contrast with the reports of either no significant difference by sex[33] or that females were slightly more likely to practice DSH than males.[5,34]

However, a lower prevalence of males was also reported by Jacob et al.,[35] possibly explained by the limited number of DSH options in their semi-structured interview. Because the nature of an interview itself can be socially stigmatizing, results may underreport DSH in male respondents. Responses to interviews in studies depend on the method and quality of how questions are asked. Jacob et al emphasized that underreporting is higher with face-to-face interviews due not only to the stigma attached to the area of study and the presence of others nearby but also to the perception of the level of confidentiality of the responses.

Sufficiency of household income is defined as an external negative reinforcement factor. We found that adolescents who reported insufficient family income were more likely to engage in DSH than those who reported sufficient income (adj. OR = 2.713, 95% CI = 1.058 – 6.958, *P*-value = 0.038). Perception by peers that they are of low income (i.e., low social status) can produce a lack of supportive friends and also create bullying.[36,37] Bullies and victims of DSH behavior are less likely to come from high socioeconomic backgrounds. Although low socioeconomic background had a significant association with self-harm when controlling for bullying behaviours, it ceased to be significant after controlling for parental conflict.[36] The insufficiency of family income or low socioeconomic background was the factor with the lowest weight for predicting DSH behaviour. Thus, conflicts both with and between parents may be more important for self-harm than one's socioeconomic background.[36]

This present study had certain limitations and strengths. The study was conducted in northern area of Thailand only. The study used a multi-stage random sampling to recruit a large sample. The psychometric properties of the research instruments were at an acceptable level. The STROBE guidelines were followed in the reporting the cross-sectional study. Because this was a cross-sectional study, generalizability may be limited. Future research should include rural and other urban settings. Further differentiation between early and late adolescents would be useful. Although the research design is more resource intensive, longitudinal research would be important in understanding the adolescents' cognition and mood and their cause-effect relationship. Research over time would be useful in understanding the trajectory of DSH behaviours. The Deliberated Self-Harm Inventory should be further revised by including an additional question, "Did you have thoughts of suicide in the past six months?" Responses to this question

would provide a stronger link between repetitive DSH behaviour and suicidal ideation.

Adolescents' DSH is a serious and complex problem. The intra- and extra- personal elements of the hypothesized predictors are a glimpse into the importance of adolescents' DSH and the reasons for engaging in DSH. School nurses should screen adolescents for DSH, either in the aggregate or individually, and consider conducting annual mental health check- ups, also provide overall basic psychoeducation within the classroom without any personalization to avoid embarrassment and stigmatization. They should increase their attention to promote a positive psychology to be specific to each adolescents' grade level and reduce the negative reinforcement factors and enhance a positive reinforcement factor. They might be able to reinforce a positive relationship or increase the adolescents' perception of their parents' relationship by encouraging or providing counseling or therapy for parents and their children.

Gatekeepers are teachers, school nurses, school psychologists, or relevant officers within a particular responsible area for providing primary assistance to the students. They can control access to something, or inhibits someone's risk behaviour, or otherwise regulates related to mental health problems. Nursing practice should focus on developing training skills for gatekeepers on how to approach the adolescents' DSH. School nurses could initiate and collaborate with other gatekeepers to engage in primary care prevention activities, such as developing and implementing protocols of DSH prevention.[38] Protocols could include access to individual or group counselling or appropriate referral to healthcare professionals with expertise in working with adolescents. If classroom is no longer in a physical space, but rather a virtual one, teachers may check their students one- on- one and develop a sustained partnership by supporting them in the context of family and community therapy. If adolescents face a crisis or deliberate self- harm behaviours are suspected by teachers, they should notify the school' s nurse and psychologist. There may be the necessity to request permission from the parents to visit the home. Secondary care prevention is transferring adolescents with DSH behaviours to the specialist for treatment and support provided by psychiatrists and other health professionals for specific expert care, often provided in outpatient clinics. Tertiary care for prevention and treatment of adolescents' DSH is highly specialized mental health care usually over an extended time period that involves advanced and complex procedures and treatments performed by mental health specialists in state-of-the-art facilities.

In conclusion, Deliberated Self- Harm (DSH) behaviour among Thai adolescents was at 91.7%. DSH was associated with lower grade (grade 10), being male, parents not living together, and insufficient household income.

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