

# ปัจจัยทำนายการจงใจทำร้ายตนเองในวัยรุ่นไทย

## Predicting Factors of Deliberated Self-Harm among Thai Adolescents

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### บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยทำนายการจงใจทำร้ายตัวเองในวัยรุ่นไทย กลุ่มตัวอย่างจำนวน 360 คน คัดเลือกแบบสุ่มหลายขั้นตอน คือวัยรุ่นไทยอายุ 10-19 ปี ที่ศึกษาอยู่ในโรงเรียนมัธยมศึกษาตอนปลายในภาคเหนือของประเทศไทย เก็บข้อมูลเมื่อ กรกฎาคม พ.ศ. 2562 ถึงมกราคม พ.ศ. 2563 เครื่องมือที่ใช้วิจัยมีจำนวน 7 แบบสอบถาม คือ ข้อมูลส่วนบุคคล การจงใจทำร้ายตนเอง สัมพันธภาพในครอบครัว ความผูกพันต่อโรงเรียน การรับรู้ความเครียด แบบประเมินปัจจัยป้องกันด้านบุคคล และแบบวัดการควบคุมตนเอง ซึ่งมีค่าความเชื่อมั่นอยู่ระหว่าง 0.81 - 0.89 วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา สหสัมพันธ์ของเพียร์สัน และการวิเคราะห์ถดถอยเชิงพหุคูณ

ผลการวิจัยพบว่า กลุ่มตัวอย่างมีการจงใจทำร้ายตนเองในหกเดือนที่ผ่านมาเฉลี่ย 6.1 ครั้ง (SD = 2.83) ปัจจัยที่ทำนายการจงใจทำร้ายตนเองในวัยรุ่นไทยได้ดีที่สุดคือความเครียด ( $\beta = .271, p < .001$ ) รองลงมาเป็นเพศ (ชาย) ( $\beta = .197, p < .001$ ) ความผูกพันต่อโรงเรียน ( $\beta = .193, p < .001$ ) ปัจจัยทำนายที่พบมีนัยสำคัญทางสถิติทั้ง 5 ปัจจัยนี้สามารถอธิบายความแปรปรวนในการจงใจทำร้ายตนเองของวัยรุ่นไทยได้ 18.80% ( $R^2 = 0.188, \text{Adj. } R^2 = 0.177, F(5,354) = 16.422, p < .001$ ) การค้นพบครั้งนี้สามารถนำไปใช้เพื่อการจัดโปรแกรมเสริมสร้างความเข้มแข็ง และป้องกันการจงใจทำร้ายตัวเองในวัยรุ่นไทยได้

**คำสำคัญ:** วัยรุ่น, การจงใจทำร้ายตัวเอง, ความเครียด, เพศ, ความผูกพันต่อโรงเรียน

### Abstract

This descriptive predictive research aimed to examine deliberate self-harm (DSH) and determine its predictors. A multi-stage random sampling was used to recruit the sample of 360 Thai adolescents aged 10-19 years who were studying in secondary schools in northern Thailand.

The data were collected from July 2019 to January 2020. The research instruments were 7 self-report questionnaires. Their consistency reliability ranged from 0.81-0.89. Descriptive statistics, Pearson's correlation coefficients, and stepwise multiple regression were used for data analyses.

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Results revealed that the participants had their DSH in the past six months about 3-14 times with a mean score of 6.11 (SD = 2.83). The best predicting factor was stress ( $\beta = .271$ ,  $p < .001$ ), following by sex (male) ( $\beta = .197$ ,  $p < .001$ ), student-school connectedness ( $\beta = .193$ ,  $p < .001$ ), self-control ( $\beta = -.187$ ,  $p < .001$ ), and resilience ( $\beta = -.172$ ,  $p < .01$ ). These five significant predicting factors were together accounted for 18.80% ( $R^2 = 0.188$ , Adj.  $R^2 = 0.177$ ,  $F_{5,354} = 16.422$ ,  $p < .001$ ) in the variance of DSH. These findings suggest that school nurses, teacher or related interdisciplinary personnel could be utilize as foundation knowledge to develop activities or programs to strengthen student-school connectedness, self-control and resilience, as well as diminish stress among Thai school adolescents to prevent DSH in male and female adolescents by more focused on male adolescents.

**Keywords:** Adolescents, Deliberate Self-harm, Stress, Sex, School Connectedness

## Introduction

Deliberate self-harm (DSH) refers to an intentional behavior of direct destruction of body tissues which causes own non-fatal physical assault injuries to the extent that bleeding occurs or causes a bruise to appear and without conscious suicidal intent.<sup>1</sup> The examples of DSH include self-cutting, burning, punishing, beating, hair pulling, head banging, using drug or object with intent of self-hurt.<sup>2</sup> DSH was the fifth leading cause of illness and disability among people aged 10-19 years worldwide.<sup>1</sup> In 2010, acts of DSH in Thailand were categorized using ICD 10 classification alone, 24,924 hospitalizations, and an incidence of 35.6/100,000 people were found. The highest level of total treatment cost was 149,672,190 Baht and the average length of stay was 2.9 +/- 6.7 days.<sup>3</sup>

From the diathesis-stress model of DSH<sup>4</sup> and reviewing of related literatures, stress can be categorized into 4 factors; bio-psycho-social predisposing factor, precipitating factor, perpetuating factor, and protective factor. Firstly, Bio-Psycho-Social predisposing factor is the condition which operates from early life and renders the adolescent's vulnerability to the DSH, e.g. genetic or sex (male or female). Secondly, precipitating factor can be either internal or external element that causes or contributes

to the occurrence of DSH, e.g. the stress or anxiety in daily life. Thirdly, the perpetuating factor is an element that prolongs the situation or condition indefinitely, e.g. lower parental relationship or perceived less school connectedness.<sup>5</sup> Lastly, the protective factor is an element serving or intending to protect the adolescent or learn how to cope in the well-being, including self-control, individual's resilience.<sup>6,7</sup>

Many studies revealed that poor family relationship and poorer communication with parents were significantly associated with DSH.<sup>8</sup> Likewise, literatures also stated that adolescents with greater physiological hyperarousal when responding to stress were more likely to engage in DSH. However, the perception of school connectedness to safety at school has been found to reduce risk of repetitive DSH in adolescents.<sup>5</sup> Meanwhile, several studies also indicated a particularly high rate of DSH among adolescent girls.<sup>8</sup> On the other hand, the proportion of severe self-harm among male adolescents was much higher.<sup>9</sup> Furthermore, some studies revealed that self-control and resilience were identified as a component of protective antecedent at the individual level of DSH in adolescents and avoid responses that related to DSH as well.<sup>9</sup>

According to the review of literatures, risk factors for DSH among Thai adolescents were rarely

found, and there was also the limited number of examination of predisposing, precipitating, perpetuating, and protective factors. The conceptual framework of this study derived from the diathesis-stress model of DSH<sup>8</sup> and related literature aimed to examine DSH and predicting factors of DSH among Thai adolescents and to strengthen Thai adolescents in preventing DSH as well as the risk of suicidal ideation in early adulthood.<sup>10</sup>

### Conceptual Framework for the study

Related literature reviews and the diathesis-stress model of DSH<sup>4</sup> are used in explaining the conceptual framework for the study. Sex is a biological vulnerability. Stress is a precipitating factor. Family relationship and school connectedness are both perpetuating and protective factors. For example, adolescents who have lower family relationship or perceive less school connectedness tend to have more engage in DSH than adolescents with higher family relationship or school connectedness.<sup>5</sup> Lastly, resilience and self-control are protective factors which refer to the conditions or coping strategies among adolescents on DSH.

### Research objectives

This study described Thai adolescents' DSH and examined its predictors including sex, family relationship, school connectedness, resilience, stress, and self-control.

### Research Hypothesis

Sex, family relationship, school connectedness, stress, resilience, and self-control have influenced predictive on DSH among Thai adolescents.

### Materials and methods

A descriptive correlational predictive study was conducted to examine the influence of

six predictors (including family relationship, school connectedness, resilience, sex, self-control, and stress) of DSH among adolescents in Thailand. The target population was 360 Thai adolescents who studying in Grade 9-12 (Mathayomsuksa 4-6) of secondary schools located in the northern part of Thailand. Sample size was based on Hair, Black (11) suggestion, where 5 or 10 subjects per each predictor variable considered appropriate. There were six predictor variables in this study. Therefore, the minimum sample size was 60. A multi-stage random sampling technique was used to recruit 360 high school students from the target population who met the study inclusion criteria. There were ages between 10 to 19 years, Thai language literacy, having never been diagnosed with a mental health problem by a psychiatrist or a psychologist, and being permitted by parents to participate in this study. Participants who didn't meet the criteria will be excluded from participating in this study.

### Research instruments

A demographic questionnaire was developed by the researcher and expert colleagues would be used in collecting the participants' personal information, including, sex, age, and GPA.

Deliberate Self-Harm Inventory: 10-Item Version Revised (DSHI-9r) was developed by Lundh, Wångby-Lundh<sup>12</sup> used to measure deliberate self-harm (DSH). It consists of 10 questions. Participants were asked if they had deliberately engaged during the past 6 months. They were also instructed to rate from 0 to 6, where 0, 1, 2, 3, 4, 5 and >5 referred to "never", "one time", "two times", "three times", "four times", "five times", and "more than five times", respectively. A total score (from 0 to 60) on the DSHI-9r could thus be calculated by summarizing the number of times a person reported his/her engagement in these self-harming. Its internal

consistency reliability ranged from .90-.91.<sup>12</sup> In this study, its reliability was .83.

Family Relationship Questionnaire was developed by Punwichai<sup>15</sup> used to measure family relationship (FAM). Participants were asked to rate on 1-4 rating scale. It has 40 items. The contents of questionnaire had both positive, where the score of 4 meant 'very often' and of 1 referred to 'almost never', while negative questions were scored in reverse direction. The higher the mean score was, the better the family relationship became. After examining the reliability in the adolescent group, Cronbach's alpha coefficient of .89 was found.<sup>15</sup> In this study, its reliability was .86.

Student-School Connectedness Scale developed was developed by Spanjers<sup>16</sup> used to measure student-school connectedness (SSC). It contained 27 items. The contents of questionnaire were based on 1-4 rating scale, where 1, 2, 3 and 4 represented "disagree", "somewhat disagree", "somewhat agree", and "agree", respectively. Higher score indicated better school connectedness within their schools. A total score (from 0 to 108) on the SSCS could thus be calculated by summarizing total scores of adolescents' answers to the questionnaire. Its internal consistency of total and subscale scores ranged from .88 to .93.<sup>16</sup> In this study, its reliability was .81.

Resilience Factors Scales for Thai Adolescents was developed by Takviryanun.<sup>17</sup> The contents of questionnaire included 25 questions allowing respondents to assess what statements most reflected their own feelings on the basis of 1-4 Likert scale - totally untrue (1 point) to totally true (4 points). The possible scores ranged from 25 to 100 so a higher score represented a high prevalence of resilience factors. The score interpretation was divided into 3 equal ranges: low level (26-50), moderate level (51-75) and high level (76-100). After

examining the reliability in the adolescent group, Cronbach's alpha coefficient of .90-.92 was found.<sup>17</sup> In this study, its reliability was .84.

Self-Control Questionnaire was developed by Saengthongdee<sup>18</sup> and composed of 23 questions with 5-rating scale. They are also instructed to rate from 1 to 5, where 1, 2, 3, 4, and 5 refer to "mostly agree", "much agree", "moderately agree", "less agree", and "least agree", respectively. A total score ranged from 23-115. A higher score was a high self-control, while a lower score was interpreted as low self-control. Its scoring criteria were as follows: mean score of 23.00-54.00 (low level), 54.01-85.00 (moderate level) and 85.01-115.00 (high level). After examining the reliability in the adolescent group, Cronbach's alpha coefficient of .86 was found.<sup>18</sup> In this study, its reliability was .89.

Thai version of Perceived Stress Scale-10 was developed by Wongpakaran<sup>19</sup>. The participants are requested to respond to 10 questions on a 5-rating scale ranging from 0 (never) to 4 (very often). Each question had 5 scales ranging from 0 to 4 in which 0, 1, 2, 3 and 4 represented "never", "almost not", "sometimes", "relatively often" and "very often", respectively. Besides, scores ranged from 0 to 40; higher composite scores were indicative of greater perceived stress. The good internal consistency of the scale was found with a Cronbach's alpha of .84 in the student group.<sup>19</sup> In this study, its reliability was .82.

### Back-translation technique

The original English version of Deliberated Self-Harm Inventory: 10-Item Version Revised (DSHI-9r) and Student-School Connectedness Scale (SSCS) were translated into Thai using a back-translation technique to ensure its content validity and cultural comparability.<sup>20</sup> The translation accuracy verification and content validity was validated by the

panel of four experts. Two of them were specialized in psychiatric doctor (psychiatrist) and mental health nursing instructor. The other two were native Thai linguists who were fluent in both languages and worked as nursing instructors at The Johns Hopkins University School of Nursing, and former English instructors at a University Language Institutes too.

#### **Ethical consideration**

The study proposal and all research instruments were approved by the IRB committee of the Burapha University (IRB code # 04-05-2562). All participants were informed regarding study purposes and outcomes. Their participation in the study was on voluntary basis and their decision to withdraw from it was respected. The informed consent was obtained from each participant and their parents prior to data collection. The confidentiality was maintained with the closure of names in the research report. Besides, if some participant faced problems related to DSH behavior, the researcher was willing to help them by providing overall basic psycho-education within the class without any personalization for preventing the embarrassment and stigmatization.

#### **Setting of the Study**

The northern of Thailand a tropical climate with fine particulate matter (FPM) such as PM10 and PM2.5 from haze smog generates a serious air pollution problem in the northern of Thailand. These pollutants have serious effects on mental and physical health.<sup>21</sup> The northern of Thailand's social and cultural context of competitive lifestyle causes anxiety, depression, stress, negative thinking, and feeling too. These factors are a terrible state of mind, which associates with the increase of DSH. Researchers find that adolescents need the relief from a terrible state of mind, which is the most frequently reported motive for DSH.<sup>10,13</sup> Hence, the research population is from secondary schools in the northern of Thailand.

#### **Data collection procedures**

The Principal Investigator (PI) submitted the research proposal and IRB approval to school administrators and teachers of each school involved in this present study. The data collection procedures were discussed with Thai adolescents who met this research criterion in the target schools. The PI made self-introduction along the provision of explanations of purpose, method and confidentiality of the study and of how to respond to the questionnaires. They were asked to fill the questionnaire in the private room provided. Each participant took at least approximately 30 minutes to complete all questionnaires.

#### **Data analysis**

Data were analyzed by using a statistical software program. The participants' demographic characteristics and the study variables were described using descriptive statistics including frequency, percent, mean and standard deviation. Pearson's correlation coefficients and stepwise multiple regression analysis were performed to shed the light on DSH and to analyze the predicting factors of DSH among Thai Adolescents, respectively. An alpha level of  $p < .05$  was set at a level of significance for the study.

#### **Results**

A total participant participated in this study was 360 adolescents. There were approximately equal percentage of male and female (49.4% and 50.6%). Their age ranged from 15 to 19 years old with a mean of 16.42, (S.D. = 0.91). More than one half of participants (67.5%) had their grade point average (GPA) above 3.00. Their GPA ranged from 1.00-4.00 with a mean of 3.16 (S.D. = 0.56).

There were 45.9% of the total participants

engaged in DSH with approximately equal percentage for male (47.0%) and female (44.7%). Their engagement in DSH ranged from 3-14 times with a mean of 6.1 (S.D. = 2.83). It was found that, in the past 6 months, most of them (16.7%) committed self-harm for 6 times, while a few of them (0.3%) engaged in self-harm for 14 times.

### Description of the study variables

The means, standard deviations, possible and actual ranges of DSH, family relationship, student-school connectedness, resilience, self-control, and stress were 6.11 (S.D. = 2.83), 113.82 (S.D. = 8.78), 74.61 (S.D. = 6.03), 77.74 (S.D. = 5.34), 70.60 (S.D. = 8.52), and 26.35 (S.D. = 3.44), respectively.

### Predicting Factors of Deliberated Self-harm

Table 1 presented the correlation matrix among the study variables. Five predictors were significantly correlated with DSH, except for family relationship, which was not correlated ( $p > .05$ ).

Sex (girl) revealed that a significant negative correlation with DSH was at a low level ( $r = -.211$ ,  $p < .001$ ). Self-control revealed that a significant negative correlation with DSH was at a low level ( $r = -.179$ ,  $p < .05$ ). Student-school connectedness revealed that a significant negative correlation with DSH was at a low level ( $r = -.114$ ,  $p < .05$ ). Stress revealed that a significant positive correlation with DSH was at a low level ( $r = .256$ ,  $p < .001$ ). Resilience revealed that a significant negative correlation with DSH was at a low level ( $r = -.208$ ,  $p < .001$ ).

Table 2 showed a result from stepwise multiple regression analysis which indicated that stress ( $\beta = .271$ ,  $p < .001$ ) is the best predicting factor. Following by sex (male) ( $\beta = .197$ ,  $p < .001$ ), student-school connectedness ( $\beta = .193$ ,  $p < .001$ ), self-control ( $\beta = -.187$ ,  $p < .001$ ), and resilience ( $\beta = -.172$ ,  $p < .01$ ). These five significant predicting factors were together accounted for 18.80% ( $R^2 = 0.188$ , Adj.  $R^2 = 0.177$ ,  $F_{5,354} = 16.422$ ,  $p < .001$ ) in the variance of Thai adolescents' DSH.

**Table 1** Correlation matrix among the study variables (n = 360)

Variables	DSH	SEX	SEL	SSC	STR	RES	FAM
DSH	1.00	.211**	-.179*	-.114*	.256**	-.208**	-.010
SEX		1.00	.031	-.104*	.164*	-.021	.000
SEL			1.00	.206**	-.001	.218**	.134*
SSC				1.00	-.010	.099	.030
STR					1.00	-.049	.066
RES						1.00	.130*
FAM							1.00

Note: SEL= Self-control, SSC = School connectedness, STR = Stress, RES = Resilience, FAM = Family relationship, DSH = Deliberate self-harm, \* $p < .05$ , \*\* $p < .01$

**Table 2** Predicting factors of Deliberated Self-harm (n = 360)

Variables	B	Std. Error	beta	t
Stress	0.226	0.051	0.217	4.461***
Resilience	-0.120	0.034	-0.172	-3.489**
Sex (Male = 1, Female = 0)	1.468	0.364	0.197	4.038***
Student-school connectedness	0.119	0.030	0.193	3.911***
Self-control	-0.082	0.022	-0.187	-3.739***

Constant = 31.197\*\*; R2 = 0.188, Adjust R2 = .177, F5,354 = 16.422\*\*

\*\*p < .01, \*\*\*p < .001

**The regression equation could be introduced in terms of raw scores as follows:**

Deliberate Self-Harm score = 3.120 + 1.468 (Male) - 0.082 (Self-control) + 0.119 (Student-school connectedness) + 0.226 (Stress) - 0.120 (Resilience)

**Discussion**

About almost one half of the Thai adolescents in this study engaged in DSH (45.9%) with approximately equal percentage for male and female. This percentage is congruent with several previous studies of DSH among adolescents in many countries where its rate ranged from 23.5-54.9%.<sup>2</sup> For example in England, a study in adolescents age 12 to 17 year olds found DSH about 46.6% also reported that they had engaged in self-harm in the past 12 months.<sup>2</sup> While approximately 23.5% of young Chinese adolescents in Hong Kong had DSH in the preceding 12 months.<sup>8</sup> While stepwise multiple regression indicated sex (male), stress, school connectedness, self-control, and resilience (individual protective factor) were significant predictors of DSH among Thai adolescents. The factor with the highest Beta weight for prediction was stress ( $\beta = 0.226$ ,  $p < .001$ ), followed by sex (male adolescent) ( $\beta = 1.468$ ,  $p < .001$ ) and school connectedness ( $\beta = 0.119$ ,  $p < .001$ ).

These findings supported the diathesis-stress model of DSH<sup>4</sup> and literatures. Our results showed that the school connectedness was just a perpetuating factor which influenced DSH. Importantly, family relationship is only one factor that could not predict Thai adolescents' DSH behavior. Stress is a precipitating factor. Finally, resilience and self-control are the protective factors. The best predictor of Thai adolescents' DSH was stress that would a precipitating factor. It referred to a specific event or triggered the onset of adolescents' DSH. It meant that adolescents who have a high score of stress tended to have more engaged in DSH. In these instances, this finding corresponds with previous studies. Social stress could also prompt episodes of DSH. For instance, academic stress, conflict friend, disputes with roommates, fight with friend or the disruption of interpersonal relationships could induce DSH. This finding was also supported by the research that linked DSH to stress, and reflected intrapersonal and interpersonal stressors and other distressing events to be common precipitants of DSH.<sup>14</sup>

Sex (male) was an unmodifiable factor and a biological vulnerability predisposing adolescents towards negative effect. It is congruent with previous

studies. Sex difference in self-harm severity was significant, as the proportion of severe self-harm was much higher among male cases. One study revealed that male adolescents with a history of DSH generally reported a younger age of onset for their DSH than females with a history of DSH.<sup>9</sup> The school connectedness is a perpetuating factor which influenced DSH. Adolescents who had perceived low school connectedness tended to engage in deliberate self-harm than those who had high school connectedness. Whereas, for female adolescents who tended to have a high level of school connectedness, their perception of stress and deliberate self-harm might decrease when compared adolescent males. Among males, dissatisfaction with school connectedness was significantly associated with DSH.<sup>12</sup> In addition, factors associated with self-harm among bullied males included psychological factors, problems with schoolwork, worries about sexual orientation and physical abuse.<sup>9</sup> Additionally, school-related factors such as academic achievement, social and safety-related should be considered as the risk factors for DSH in Thai adolescents.<sup>9, 14</sup>

For the resilience, the person with good resilience and a high score of resilience tended to have a low level of deliberate self-harm. On the other hand, one with low resilience would have more engaged in DSH. According to a previous study on Norwegian adolescents who had violent experiences and engaged in DSH, their low resilience significantly and correlated with more psychological problems. Therefore, adolescents with high resilience would recover to a normal state quickly; however, those with low resilience may increase encounter to DSH. The final predictor is self-control which found to be a variable against DSH among Thai adolescents. Adolescents with good self-control tended to have a low level of deliberate self-harm. Some studies revealed that self-control have been identified as a

component of protective antecedent at the individual level. This includes changing emotions, continuing a task even when wanting to stop, and resisting impulses.<sup>6</sup>

### Strength and Limitation

The present study was conducted by using a multi-stage random sampling to recruit a sample size adequate and large enough to achieve the power of analysis 80%, and acceptable for being calculated to represent 25% of the total population. Importantly, the quality of research instruments of how the psychometric properties were assessed. Therefore, all psychometric properties were at an acceptable level. Generalizability may be limited since this is a cross-sectional study in one setting of Thailand, may need to examine a variety of settings, and may split to be early and late adolescents. The measure of DSH may be too much sensitive because 1 time of doing self-harm is considered as DSH. In the further study may consider use other measures for DSH to be less sensitive.

### Recommendation

The future research should conduct it at the multicultural research involves dealing with countries that have different languages which impact on DSH behavior. The findings could be used as fundamental information to develop nursing care plan to prevent DSH for Thai adolescents. An intervention to strengthen and enhance the school connectedness, resilience, self-control, and reduce stress among Thai adolescent to prevent DSH should be developed and implemented for both gender, specifically for adolescent males.

### Conclusion

Findings from this study indicated that adolescents' vulnerability (diathesis) is a glimpse

into the importance of adolescents' DSH that "why" adolescents choose to DSH and engaging in this behavior more than other ages. The findings would be guideline the nurse researchers and specialist, related health personnel, and so on should increase attention to further and deeper promote in terms of an intervention study or a protocol in nursing practice. Consequently, appropriate and effective means to prevent DSH among Thai adolescents would be achieved.

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### References

1. Wu D, Rockett IRH, Yang T, Feng X, Jiang S, Yu L. Deliberate self-harm among Chinese medical students: A population-based study. *Journal of Affective Disorders*. 2016;202:137-44.
2. Morey Y, Mellon D, Dailami N, Verne J, Tapp A. Adolescent self-harm in the community: an update on prevalence using a self-report survey of adolescents aged 13-18 in England. *Journal of Public Health*. 2017;39(1):58-64.
3. Paholpak P, Rangseekajee P, Arunpongpaial S, Piyavhatkul N, Thepsuthammarat K, Paholpak S. Characteristics and burden of hospitalization because of intentional self-harm: Thai national, hospital-based data for 2010. *J Med Assoc Thai*. 2012;156-162. (in Thai)
4. Nock MK, Cha CB. Psychological models of nonsuicidal self-injury. Washington, DC US: American Psychological Association;2009.
5. Baetens I, Claes L, Martin G, Onghena P, Grietens H, Van Leeuwen K, et al. Is nonsuicidal self-injury associated with parenting and family factors? *The Journal of Early Adolescence*. 2014;34(3):387-405.
6. Van der Wal W, George AA. Social support-oriented coping and resilience for self-harm protection among adolescents. *Journal of Psychology in Africa*. 2018;28(3):237-41.
7. Bennardi M, McMahon E, Corcoran P, Griffin E, Arensman E. Risk of repeated self-harm and associated factors in children, adolescents and young adults. *BMC psychiatry*. 2016;16(1):421.
8. Law B, Shek D. Self-harm and suicide attempts among young Chinese adolescents in Hong Kong: prevalence, correlates, and changes. *Journal of Pediatric and Adolescent Gynecology*. 2013;26(3):26-32.
9. Campbell KN. Resilience and Self-Control among Georgia Southern Students: A Comparative Study between ROTC Students and Non ROTC Students. 2014.
10. Rungsang B, Chaimongkol N, Deoisres W. Predictors of Suicidal Ideation among Thai Adolescents. *Journal of The Royal Thai Army Nurses*. 2017;18(1):64-73. (in Thai)
11. Hair J, Black W, Anderson R, Babin B. *Multivariate Data Analysis (8, ilustra ed.)*. Cengage Learning EMEA. 2018.
12. Lundh L-G, Wångby-Lundh M, Paaske M, Ingesson S, Bjärehed J. Depressive Symptoms and Deliberate Self-Harm in a Community Sample of Adolescents: A Prospective Study. *Depression Research & Treatment*. 2011:1-11.

13. Viborg N, Wångby-Lundh M, Lundh L-G, Wallin U, Johnsson P. Disordered eating in a Swedish community sample of adolescent girls: subgroups, stability, and associations with body esteem, deliberate self-harm and other difficulties. *Journal of Eating Disorders*. 2018;6(1):5.
14. Lundh Lg, Wångby-Lundh M, Bjärehed J. Deliberate self-harm and psychological problems in young adolescents: Evidence of a bidirectional relationship in girls. *Scandinavian journal of psychology*. 2011; 52(5):476-83.
15. Punwichai P. The Effects of Emotional Intelligence Practice Program on Enhancing Family Relations of Prathomsuksa Six Students Master's thesis, Counseling psychology, Graduate study, Burapha University; 2005 (in Thai).
16. Spanjers KE. Development and Structural Analysis of the Student-School Connectedness Scale (SSCS), Thailand: Doctoral thesis of The Graduate School College of Education, The Pennsylvania State University; 2016.
17. Takviriyannun N. Development and testing of the Resilience Factors Scale for Thai adolescents. *Nursing & health sciences*. 2008 (in Thai); 10(3):203-8.
18. Saengthongdee P. Self-Control And Social Bond Factors Influencing Juvenile Drug Offending: A Case Study at Juvenile Training Centers in Bangkok, Thailand: Master's thesis of Arts Program in Criminology and Criminal Justice, Mahidol University; 2007 (in Thai).
19. Wongpakaran T, Wongpakaran N. Confirmatory factor analysis of Rosenberg Self-Esteem Scale: A study of Thai student sample 2011 (in Thai). 59-70 p.
20. Beaton D, Bombardier C, Guillemin F, Ferraz M. Guidelines for the process of cross-cultural adaptation of self-report measures. 2016.
21. Jeensorn T, Apichartwiwat P, Jinsart W. PM10 and PM2.5 from haze smog and visibility effect in Chiang Mai Province Thailand. *Applied Environmental Research*. 2018; 40(3):1-10. (in Thai)