

Factors Contributing to Non-suicidal Self Injury in Korean Adolescents

Kim, MiYoung¹ · Yu, Jungok²

¹Department of Nursing, Kaya University, Gimhae

²Department of Nursing, Dong-A University, Busan, Korea

Purpose: Non-Suicidal Self-Injury (NSSI), a highly prevalent behavior in adolescents, refers to the direct destruction of one's body tissue without suicidal intent. To date, the prevalence of adolescent self-injury in South Korea and its associated factors remain unknown. This study aims to determine the prevalence of self-injury in Korean adolescents as well as its associated factors. **Methods:** We assessed 717 middle school students by means of an anonymous self-report survey. Information about demographic characteristics, lifestyle, anxiety and depression, self-esteem, and parenting behavior was obtained. Data were analyzed using χ^2 test, t-test and multiple logistic regression. **Results:** NSSI was reported by 8.8% of respondents. Univariate analyses showed associations of exposure to alcohol use, anxiety, depression, self-esteem, and parenting methods with self-injury. In multiple analyses, alcohol use, anxiety, and parental abuse were associated with lifetime self-injury. **Conclusion:** The rate of NSSI in the South Korea was found to be lower than those of other countries. As our study suggests that alcohol use, anxiety, and parental abuse are associated with lifetime self-injury, health care providers at school should take these factors into account when developing prevention and intervention programs for adolescents.

Key Words: Adolescent, Self-Injurious behavior, Drinking, Anxiety

INTRODUCTION

Non-Suicidal Self-Injury (NSSI) refers to the behavior that intentionally and repeatedly hurts one's own body, although there is no intention to attempt suicide [1]. This contrasts with the basic behavior of humans seeking pleasure and avoiding pain. Reported prevalence rates of NSSI varied among studies but the prevalence of NSSI in adults is known to be 4~6% [2]. On the other hand, prevalence rates of NSSI in adolescents were reported to be quite high. In a study of the prevalence of NSSI through the survey of a community sample of 1,862 adolescents in three countries, including European countries and the United States, approximately 24% of the adolescents reported at least one NSSI episode [3]. In addition, according to a study of systematic literature review of the prevalence of NSSI in adolescents in schools and local communities, 18% of adolescents reported engaging in NSSI [4]. These study results

show that NSSI in adolescents has recently been widespread even in cases other than clinical situations such as mental disorders in Western countries.

In general, NSSI begins in early adolescence of the ages between 12 and 14 years [5], but because it is a behavior that injures one's own body in secret, it is typically not easily detected by the family or in the school until the problem becomes serious, so it is necessary to pay attention to the risk of NSSI among middle school students who are in early adolescence. The most common type of self-injurious behavior is cutting the skin with a knife, and other major types of NSSI include burning, scratching, hitting the areas of the body, and hindering wound treatment. In the case of adolescents, 80% of those reporting engaging in NSSI are reported to exhibit the behavior of cutting or stabbing the skin with a sharp object [6], so although NSSI does not indicate suicidal intention, it is likely to cause physical damage. In addition, NSSI is a high-risk behavior

Corresponding author: Yu, Jungok

Department of Nursing, Dong-A University, 32 Daesingongwon-ro, Seo-gu, Busan 49201, Korea.
Tel: +82-51-240-2783, Fax: +82-51-240-2920, E-mail: joyu@dau.ac.kr

- This study was supported by Dong-A University research grant.

Received: Mar 26, 2017 / Revised: Jul 26, 2017 / Accepted: Jul 27, 2017

This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

among adolescents' problem behaviors since it can easily lead to suicidal ideation and is likely to lead to death [7] and it can cause psychological distress to the friends and family members around self-injuring adolescents.

NSSI is known as the behavior caused by reciprocal influences of various factors [1]. Looking at an explanation of NSSI from the perspective of learning theory [8], the motivations for NSSI are explained in terms of the positive reinforcement as a behavior to attract others' attention and the negative reinforcement of using NSSI as a coping mechanism to alleviate emotional distress or discomfort. In other words, concerning the most common motivation for NSSI in adolescents, it is said that individuals engage in NSSI in order to fill the emotional holes that cannot be easily healed because of past psychological trauma or abuse experiences such as separation from parents, emotional abuse, and sexual abuse in their childhood and draw the attention of others [9,10], or NSSI functions as a means of feeling regulation which temporarily alleviates the negative emotions such as anxiety, depression, and stress when such negative emotions cannot be tolerated [3,6,9,11].

Although high prevalence rates of NSSI in adolescents are eliciting high levels of concern and interest around the world, the research on NSSI in Korea has been limited to studies which considered it as the accompanying syndrome in the research of students with disabilities [12] and some adolescents with psychiatric problems [13]. In Korea, there has been no research on the prevalence of NSSI in adolescents in general, and few studies on the risk factors for NSSI have been performed. The reason for this is that NSSI is not easily detected and the conceptual division between NSSI and suicide has been ambiguous for a long time [14]. However, the results of many recent foreign studies have indicated that NSSI is a clinical problem that has different characteristics from suicide and requires a distinct diagnosis for it. Thus, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders [15] includes the diagnosis of NSSI disorder and mentions it as an area which requires further research.

Therefore, this study aimed to investigate the status of NSSI in Korean adolescents and identify the characteristics of self-harming adolescents in order to provide basic data for understanding the NSSI of adolescents and explore effective ways to conduct an intervention.

METHODS

1. Study Design

This study was a cross-sectional study to investigate the

prevalence of NSSI in Korean adolescents and to identify the factors related to the NSSI of adolescents.

2. Subjects

The subjects of this study were a total of 717 middle school students in first to third grade attending middle schools located in U metropolitan city of Korea who understood the purpose of the study and voluntarily agreed to participate in the study. The number of subjects to achieve the purpose of this study was determined using the G*Power 3.1 program. In the logistic regression analysis, the sample size needed was 696 persons at the significance level $\alpha = .05$, the statistical power $1 - \beta = .90$, the effect size, $OR = 1.5$ [10], and the previously known prevalence of NSSI, $\rho = .1$ [4]. Thus, the questionnaires were distributed to 766 persons in consideration of the dropout rate (10%) and all of them were collected. Then, the data of 717 persons were used for the final analysis excluding 49 questionnaires (6.3%) which had insufficient responses.

3. Measures

1) Non-suicidal self-injury

Non-suicidal self-injury (NSSI) was measured using the Deliberate Self-Harm Inventory [DSHI], which is a self-report scale developed by Gratz [16] to assess self-injurious behaviors. The questionnaire consists of a total of 17 items. Each item is constructed in forms such as "Have you ever cut your wrist, arm or other parts of your body without intention to die?" or "Have you ever burned yourself with a cigarette?" to assess whether or not each type of self-injurious behavior has been done. If the answer to a question is 'yes', participants are required to further answer the questions such as when they did it, how many times they did it, when was the last time they did it, and whether they had been admitted to hospital for the action. However, in this study, the respondents were asked to report only whether or not they had the experience of NSSI and the frequency of NSSI. In this study, to use the experience of NSSI as a dependent variable, the subjects were classified as belonging to the 'NSSI group' if they had at least one experience of self-harming behavior, and as belonging to the 'non-NSSI group' if not. The tool was used in this study after obtaining the permission to use it from the developer of the assessment tool.

2) Demographic characteristics and health behavior characteristics

The demographic characteristics of subjects included

the grade level, sex, subjective academic achievement for the past one year, and the status of living together with family members. As well as the health behavior characteristics included smoking, drinking, the level of stress, and the subjective health status. The academic performance for the past one year was inquired about by dividing it into 'high-achieving,' 'medium-achieving,' and 'low-achieving.' With respect to family members and the status of living together with family members, the respondents were asked to describe all the family members and indicate whether they live with each parent for the mother and father. Regarding smoking, the respondents were asked to select "yes" or "no" in response to the question whether they had smoked at least a cigarette during the past 30 days, and with respect to consuming alcohol, they were also asked to select "yes" or "no" in response to the question whether they had had at least one glass of alcoholic drink in the last 30 days. For the level of stress, it was measured on a 5- point scale from 'very much' to 'not at all' about how stressed they were in daily life, but when analysis was conducted, the responses were re-coded into three categories of 'a lot,' 'a little,' and 'not at all.' The subjective health status was also assessed using a five-point scale from 'very frail' to 'very healthy' as to how your health condition was in general, and then the responses were re-coded into three categories of 'weak,' 'moderate,' and 'healthy.'

3) Hospital Anxiety and Depression (HAD)

The scale developed by Zigmond and Snaith [17] to assess the clinical level of anxiety and depression was translated in Korean and standardized by Oh et al. [18]. The scale consists of 14 items, composed of 7 odd-numbered items on anxiety and 7 even-numbered items on depression, and it is a 4-point scale which gives 3 points for 'mostly agree' and 0 for 'strongly disagree.' In the study of Oh et al. [18], Cronbach's α for anxiety was .89 and Cronbach's α for depression was .86. In this study, Cronbach's α for anxiety was .81 and Cronbach's α for depression was .75. If the total score for each of anxiety and depression is 8 points or more, it was judged to indicate anxiety and depression. We received the permission to use the tool from the researchers who standardized it in Korea.

4) Self-esteem

Self-esteem was assessed by the Self-Esteem Scale (SES) developed by Rogenberg [19], and to be freely used by all researchers in the world without the copyright. This instrument is a self-report 5-point Likert scale consisting of 10 items with scores ranging from 1 to 5 points, which in-

clude 5 items of positive self-esteem and 5 items of negative self-esteem. The higher the total score, the higher the self-esteem. Cronbach's α was .86 at the time of development, and Cronbach's α in this study was .86.

5) Parenting Attitudes of Parents

In order to measure parenting attitudes of the parents of the subjects, we used the questions of the parenting attitude II used in the Korean Children & Youth Panel Survey (KCYPs) (2015) of the National Youth Policy Institute [20]. The subdomains of this scale consist of 4 items of parental neglect and 4 items of abuse, and they include items such as "My parents (guardian) are interested in how I live in school and ask me about that" and "If I do something wrong, my parents (guardian) try to beat me unconditionally." Scores are determined by assigning 4 points for 'always,' 3 points for 'mostly,' 2 points for 'seldom' and 1 point for 'not at all'. In the case of neglect, the scores are converted inversely, so the higher the score, the worse care the parents take of the participant. In the case of abuse, a higher score indicates that the respondent receives more abuse. Cronbach's α in this study was .74.

4. Data Collection

The data were collected from Korean middle school students by randomly selecting two schools in each of five wards of U metropolitan city in Korea. The purpose and contents of the study were explained to the school principals and the public health teachers of the schools, and prior approval for the questionnaire survey was obtained. Between November 1, 2015 and December 10, 2015, one class for each grade of the first, second, and third grades of the school was assigned, and we distributed notices for parents to the students to participate in the study and obtained prior informed consent forms from the parents and students. The researcher visited the participants on the appointed date and distributed the questionnaires and it took 10 to 15 minutes for the participants to complete the survey. Since the questionnaires were collected at the site, the response rate was 100%, but a total of 717 questionnaires were analyzed excluding 49 cases which included unanswered items.

5. Ethical Considerations

In order to protect the subjects, after we received the approval of the institutional review board of the university of the first author (IRB No. 50). In accordance with the Declaration of Helsinki, the informed consent form included

a description of the subject's anonymity and confidentiality, and the subjects were informed that withdrawal would be possible at any time during the course of the survey, if the participant wanted to. The completed questionnaires were submitted to the researcher in the classroom immediately.

6. Statistical Analysis

The collected data were processed using the SPSS 23.0 program and analyzed according to the study purpose as follows:

First, in order to investigate the prevalence and characteristics of NSSI in adolescents, they were analyzed in terms of the frequency and percentage. The comparison of NSSI type characteristics between male and female adolescents was analyzed by the χ^2 test or Fisher exact test.

Second, the demographic characteristics and health behavior characteristics according to the presence or absence of NSSI experience were analyzed by the χ^2 test. The levels of anxiety-depression, self-esteem, and parenting attitude were analyzed by the t-test.

Third, in order to identify the factors influencing the NSSI of adolescents, multiple logistic regression analysis was performed by entering variables such as drinking, anxiety, depression, self-esteem, and neglectful and abusive parenting attitudes, in which there was a significant difference between the NSSI group and the non-NSSI group. The statistic results were expressed with the Odds ratio and 95% confidence interval.

RESULTS

1. Prevalence and Characteristics of NSSI

With respect to gender, 8.0% of boys and 9.7% of girls reported engaging in NSSI. In terms of the grade level, 10.6% of first grade middle school students, 9.0% of second grade students, and 0.6% of third grade students reported engaging in NSSI. Regarding whether or not the participant lives with the father, 8.4% of those living with their father and 14.3% of those not living with their father reported engaging in NSSI. Regarding whether the participant lives with the mother, 9.9% of those living with their mother and 14.3% of those not living with their mother reported engaging in NSSI. In terms of academic performance, 11.1% in the high-achieving group, 11.3% in the low-achieving group, and 7.5% in the middle-achieving group reported engaging in NSSI, and 9.8% of the group with a high level of perceived stress reported engaging in NSSI.

22.2% of the group of smoking participants and 7.1% of the non-smoking group reported engaging in NSSI. There was no statistically significant difference in gender, education level, living with the father, living with the mother, academic performance, stress level, cigarette smoking, and health status between the NSSI group and the non-NSSI group among middle school students.

7.1% of the non-alcohol-consuming group and 34.1% of the alcohol-consuming group reported engaging in NSSI, and the difference was statistically significant ($p < .001$) (Table 1).

2. NSSI Type Characteristics

Carving letters or pictures on one's own body was the most frequent self-harming behavior (49.2%). In addition, 30.2% of adolescents reporting engaging in NSSI reported banging or hitting the head to the point of getting a bruise, 27.0% reported scratching the body severely to the point of getting wounds, 22% reported sticking a sharp object into the skin, 12.7% reported having the skin torn or ripped by biting or having the skin bruised by beating, and 12.7% reported preventing wounds from healing, but the differences between boys and girls were not significant. However, cutting oneself with a knife was the second most frequent method of NSSI (31.7%), and 75.0% of those reporting having done it were female students compared to males of 25.0%, showing a significant gender difference between male and female students ($p = .014$) (Table 2).

3. Comparison of Anxiety, Depression, Self-Esteem, and Parenting Attitude according to the Presence or Absence of NSSI in Adolescents

There was a significant difference in the levels of anxiety, depression, and self-esteem between the NSSI group and non-NSSI group among adolescents; the level of anxiety was 5.34 ± 3.28 points and 7.79 ± 4.12 points, respectively ($p < .001$), the level of depression was 4.80 ± 3.18 points and 6.23 ± 3.66 points, respectively ($p < .001$), and the level of self-esteem was 30.60 ± 4.94 points and 27.06 ± 5.69 points, respectively ($p < .001$). The score for uninvolved parenting attitude was 6.30 ± 2.10 and 7.50 ± 2.10 , respectively ($p < .001$), and there was a significant difference between the NSSI group and non-NSSI group of adolescents. The score for the abusive parenting attitude was 6.40 ± 2.27 and 8.31 ± 3.13 , respectively ($p < .001$), and there was a significant difference between the two groups (Table 3).

Table 1. Comparative General Characteristics according to the Presence of NSSI (N=717)

Variables	Categories	Without NSSI	NSSI	χ^2	p
		n (%)	n (%)		
Total		654 (91.2)	63 (8.8)		
Gender	Male	346 (92.0)	30 (8.0)	0.64	.431
	Female	308 (90.3)	33 (9.7)		
Middle school grade	1	254 (89.4)	30 (10.6)	3.15	.207
	2	223 (91.0)	22 (9.0)		
	3	177 (99.4)	1 (0.6)		
Living-father family	No	36 (85.7)	6 (14.3)	1.68	.253
	Yes	618 (91.6)	57 (8.4)		
Living-mother family	No	26 (85.7)	5 (14.3)	2.71	.181
	Yes	628 (90.1)	58 (9.9)		
Self-reported school achievement	High	264 (88.9)	33 (11.1)	2.32	.312
	Medium	210 (92.5)	17 (7.5)		
	Low	180 (88.7)	23 (11.3)		
Stress	No	168 (94.4)	10 (5.6)	2.96	.054
	Yes	486 (90.2)	53 (9.8)		
Alcohol consumption	No	625 (92.9)	48 (7.1)	37.45	< .001
	Yes	29 (65.9)	15 (34.1)		
Current smoking	No	640 (92.9)	59 (7.1)	4.15	.065
	Yes	14 (77.8)	4 (22.2)		
Perceived health status	Poor	50 (89.3)	6 (10.7)	1.53	.463
	Fair	189 (89.6)	22 (10.4)		
	Good	415 (92.2)	35 (7.8)		

4. Factors Contributing to NSSI in Adolescents

In the Hosmer-Lemeshow test, which is a goodness of fit test for logistic regression, the p-value was .159, so a regression model constructed adopting the null hypothesis was found to fit the data. The explanatory power of the regression model for the dependent variable was 20.3%, and the accuracy of the regression model for classification of adolescents into the NSSI group and the non-NSSI group was 91.7%. Among the six independent variables in the regression model, drinking, anxiety, and abusive parenting attitude were significant. With respect to drinking, the rate of NSSI experience was 4.95 times higher in the alcohol-consuming group than in the non-alcohol-consuming group. If the anxiety score increased by 1 unit, NSSI experience increased by 1.12 times. If the score for abusive parenting attitude increased by 1 unit, NSSI experience increased by 1.21 times (Table 4).

DISCUSSION

This study was conducted to investigate the prevalence of NSSI and the factors related to NSSI in Korean adoles-

cents. Of the adolescents participating in this study, 8.8% reported having experienced NSSI. The subjects of this study were the first to third grade middle school students, and the prevalence rate was similar to 7.5% in the study of Hilt et al. [21], a study of the same age group in North America. However, Hilt et al. [21] is a study of a 12-month prevalence of NSSI, whereas the present study is research on lifetime prevalence, so a direct comparison is difficult to conduct. A study of a systematic review of the lifetime prevalence of NSSI among adolescents in schools and communities in various countries in the western region revealed that on average, about 18% of adolescents had NSSI experience [4]. However, depending on whether the prevalence of NSSI is the lifetime prevalence or the prevalence within 12 months, there are differences in the prevalence of NSSI among studies, and considering that the lifetime prevalence is generally higher, the prevalence of NSSI of 8.8% in middle school students in Korea is relatively low compared with the result of Hilt et al. [21]. However, it is difficult to draw conclusions about the prevalence of NSSI in Korean adolescents because data collection was limited to a local area in this study. Considering the risk of NSSI, it is necessary to identify the prevalence of NSSI by includ-

Table 2. Descriptive Statistics on Methods of NSSI

(N=63)

Characteristics	Categories	NSSI			χ^2	<i>p</i>
		Total	Boy	Girl		
		n (%)	n (%)	n (%)		
Carving word on body	No	32 (50.8)			0.39	.532
	Yes	31 (49.2)	16 (51.6)	15 (48.4)		
Carving marks on body	No	32 (50.8)			1.27	.259
	Yes	31 (49.2)	17 (54.8)	14 (45.2)		
Wrist-cutting	No	43 (68.3)			6.01	.014
	Yes	20 (31.7)	5 (25.0)	15 (75.0)		
Head banging	No	44 (69.8)			0.27	.601
	Yes	19 (30.2)	10 (52.6)	9 (47.4)		
Self-scratching	No	46 (73.0)			0.38	.534
	Yes	17 (27.0)	7 (41.2)	10 (58.8)		
Sharp objects into body	No	49 (77.8)			2.61	.136
	Yes	14 (22.2)	4 (28.6)	10 (71.4)		
Biting	No	55 (87.3)			4.53	.056
	Yes	8 (12.7)	1 (12.5)	7 (87.5)		
Self-punching	No	55 (87.3)			0.37	.710
	Yes	8 (12.7)	3 (37.5)	5 (62.5)		
Prevented wounds from healing	No	55 (87.3)			4.53	.056
	Yes	8 (12.7)	1 (12.5)	7 (87.5)		
Rubbing sandpaper	No	60 (95.2)			2.86	.240
	Yes	3 (4.8)	0 (0.0)	3 (100.0)		
Bleach scrubbing	No	62 (98.4)			0.92	1.00
	Yes	1 (1.6)	0 (0.0)	1 (100.0)		
Rub glass into skin	No	62 (98.4)			1.19	.476
	Yes	1 (1.6)	1 (100.0)	0 (0.0)		
Breaking bones	No	62 (98.4)			0.92	1.00
	Yes	1 (1.6)	0 (0.0)	1 (100.0)		
Other forms of self-harm	No	57 (90.5)			6.02	.025
	Yes	6 (9.5)	0 (0.0)	6 (100.0)		

Table 3. Comparison of Anxiety, Depression, Self-esteem, Parents' Neglected Attitude, Parents' Abused Attitude

(N=717)

Variables	Without NSSI	NSSI	<i>t</i>	<i>p</i>
	M±SD	M±SD		
Anxiety	5.34±3.28	7.79±4.12	-5.51	< .001
Depression	4.80±3.18	6.23±3.66	-3.36	.001
Self-esteem	30.60±4.94	27.06±5.69	5.31	< .001
Parents' neglected attitude	6.30±2.10	7.50±2.10	-4.30	< .001
Parents' abused attitude	6.40±2.27	8.31±3.13	-6.12	< .001

Table 4. Logistic Regression Analysis for Variables Predicting Engagement in Non-suicidal Self-injury (N=717)

Variables	aOR	95% Confidence interval	p
Alcohol consumption	4.95	2.28~10.75	<.001
Anxiety	1.12	1.01~1.23	.027
Depression	0.97	0.87~1.08	.625
Self esteem	0.95	0.89~1.03	.242
Parents' neglected attitude	1.12	0.98~1.29	.090
Parents' abused attitude	1.21	1.08~1.35	<.001

ing the relevant item in a large-scale survey at the national level such as the online survey of youth health behavior.

In the present study, concerning the characteristics of the adolescents' NSSI, carving letters or pictures on the body was the most frequent self-injurious behavior. However, in a study of Canadian adolescents [6], the rates of behaviors such as cutting the skin such as the wrist (41%) and hitting oneself (33%) were found to be high. In addition, in the study of adolescents with the experience of NSSI in the Netherlands and Belgium [22], the rate of banging or hitting the head was the highest at 12.9%, while in this study, the rate of banging the head was the third highest. Although the sequence was slightly different, among NSSI characteristics, carving a letter or a picture on the body, cutting the wrist with a knife, and banging the head were among the behaviors which showed high rates in the previous studies as well although ranked differently. This may have been influenced by socio-cultural factors, and it is thought that further future research is needed because there is a lack of prior studies to clarify what cultural characteristics cause such behaviors.

In this study, drinking, anxiety, and abusive parenting attitude were the factors that explain NSSI in adolescents. Among them, drinking was found to be the most influential factor of NSSI. This finding is similar to the results of the study which reported that drinking was directly associated with NSSI in female students [12]. Drinking is a predictor of impulsive behaviors among young adolescents [23] and is likely to lead to other dangerous health behaviors [3], which may lead to the possibility of NSSI and suicide. In the United States, smoking and marijuana use were associated with a higher prevalence of NSSI rather than drinking. In the Netherlands, drinking and smoking were not associated with NSSI, but the use of drugs such as marijuana was related to the high prevalence of NSSI. In this regard, according to Giletta et al. [3], NSSI is a social behavior that is not legally recognized, smoking, drinking and using drugs are similarly prohibited for adolescents,

and the mechanisms for selecting each are similar. Therefore, the factors affecting NSSI may change depending on whether each of smoking, drinking, and using drugs is a socially acceptable behavior and the purchase of each of them is legally permitted in the nation. However, in Korea, both smoking and drinking are unacceptable behaviors for teenagers, and smoking is subject to stricter social regulation than drinking, which is thought to explain the results different from the interpretation presented by Giletta et al. [3]. Thus, further research is required to understand the interaction between drinking or smoking and NSSI.

In this study, adolescents' experience of abuse by their parents was found to be associated with NSSI, and this finding supports the results of previous studies [24-26]. If you are exposed to abuse such as blame or disdain by your parents, the risk of NSSI may increase because your self-disparagement becomes worse and you lack the ability to comfort yourself or control your impulse. According to the self-punishment hypothesis [1], if children who were exposed to abuse by their parents become adults and face stressful situations, they exhibit self-injurious behavior to control and cope with stress or unpleasant emotions, re-experiencing familiar abusive experiences they experienced and learned repeatedly from their parents in the past.

In addition, in this study, anxiety was found to be significantly related to NSSI. This result supports the previous theory of motivations for NSSI which stated that controlling negative emotions is the main function of NSSI [1], and it is consistent with empirical studies which reported that the higher the level of anxiety, the higher the rate of NSSI [3,6]. However, although previous studies reported that depression was also a variable highly associated with NSSI [3,6], but it was not a related variable in this study, so further repeated research needs to be conducted in the future.

Other research reported that self-esteem was a factor explaining NSSI in female students [12], but it was excluded

in the regression analysis in this study. In this study, although self-esteem was not related, NSSI was found to increase in adolescents with negative emotions and low self-esteem. Thus, in order to prevent NSSI among adolescents, a program including a strategy for strengthening positive attitudes toward oneself and appropriately dealing with negative feelings is considered necessary.

This study has the following limitations. First, there is a possibility that there were recall bias since data were collected by the self-administered questionnaire method. Second, it may have been due to social desirability bias that the prevalence of NSSI was found to be lower in this study than in foreign studies, because NSSI is a socially unacceptable behavior. In addition, since it is a cross-sectional study, this study has a limitation on clearly explaining the causal relationship between variables. Despite these limitations, this study obtained some meaningful results in that this study provided basic data for informing adolescent health care professionals that they should consider NSSI as one of the health risk behaviors of adolescents even in community-based environments by investigating the status of NSSI in early adolescents in Korea and the related factors, and contributed to utilization of the data as the primary data in planning a youth health promotion project.

CONCLUSION

The purpose of this study was to investigate the prevalence of NSSI in adolescents and to identify the factors influencing NSSI. The prevalence of NSSI in Korean adolescents was found to be 8.8%, and drinking, anxiety and abusive parenting attitude were reported to account for 20% of self-harming behaviors. This study provided basic data for the development of nursing interventions that can reduce NSSI in adolescents through understanding of NSSI experiences of adolescents.

Based on the study results described above, we present the following suggestions.

First, repeated investigations involving more subjects are needed to identify the prevalence rate of NSSI in adolescents by methods such as the online survey on youth health behavior. Second, mental health promotion programs are needed to help to deal with negative emotions such as abusive parenting experiences and anxiety in a positive way, which were considered as risk factors for NSSI in adolescents.

REFERENCES

1. Nock MK. Self-injury. *Annual Review of Clinical Psychology*. 2010;6:339-363.
<https://doi.org/10.1146/annurev.clinpsy.121208.131258>
2. Klonsky ED, Oltmanns TF, Tukheimer E. Deliberate selfharm in a nonclinical population: Prevalence and psychological correlates. *American Journal of Psychiatry*. 2003;160(8):1501-1508.
<https://doi.org/10.1176/appi.ajp.160.8.1501>
3. Giletta M, Scholte RHJ, Engels RCME, Ciairano S, Prinstein M. Adolescent non-suicidal self-injury: A cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry Research*. 2012;197(1-2):66-72.
<https://doi.org/10.1016/j.psychres.2012.02.009>
4. Muehlenkamp J, Claes L, Havertape L, Plener P. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child Adolescent Psychiatry and Mental Health*. 2012;6(10):1-9. <https://doi.org/10.1186/1753-2000-6-10>
5. Klonsky ED, Muehlenkamp JJ, Lewis SP, Walsh B. *Nonsuicidal Self-Injury, in the series advances in psychotherapy, evidence based practice*. 1st ed. Cambridge, MA: Hogrefe Publishing; 2011. 98 p.
6. Ross S, Heath NA. A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence*. 2002;31:67-77.
7. Whitlock J, Muehlenkamp J, Eckenrode J, Purington A, Abrams GB, Barreira P, et al. Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health*. 2013;52(4):486-492.
<https://doi.org/10.1016/j.jadohealth.2012.09.010>
8. Nock MK, Prinstein MJ. A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology*. 2004;72(5):885-890.
<https://doi.org/10.1037/0022-006X.72.5.885>
9. Fox KR, Franklin JC, Ribeiro JD, Kleiman EM, Bentley KH, Nock MK. Meta-analysis of risk factors for nonsuicidal self-injury. *Clinical Psychology Review*. 2015;42:156-167.
<https://doi.org/10.1016/j.cpr.2015.09.002>
10. Fliege H, Lee JR, Grimm A, Klapp BF. Risk factors and correlates of deliberate self-harm behavior: A systematic review. *Journal of Psychosomatic Research*. 2009;66(6):477-493.
<https://doi.org/10.1016/j.jpsychores.2008.10.013>
11. O'Connor R, Rasmussen S, Hawton K. Adolescent self-harm: A school-based study in Northern Ireland. *Journal of Affective Disorders*. 2014;159:46-52.
<https://doi.org/10.1016/j.jad.2014.02.015>
12. Kim YS. Strategies of therapeutic intervention on self-Injurious behaviour in children with mental retardation. *The Journal of the Korean Association on Developmental Disabilities*. 2003;7(1):153-170.
13. Kong SS, Lee JH, Shin MY. Impact of childhood trauma on self-harm behavior in patients with eating disorders and the mediating effect of parental conflict. *Journal of Korean Acad-*

- emy of Psychiatric and Mental Health Nursing. 2009;18(1): 31-40
14. Lee DH, Yang MJ, Kim SL. Understanding adolescents' self injurious behaviors: A review of the literature. *The Korea Journal of Youth Counseling*. 2010;18(1):1-24
 15. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington: American Psychiatric Press; 2013. 991 p.
 16. Gratz KL. Measurement of deliberate self-harm: Preliminary data on the deliberate self-harm inventory. *Journal of Psychopathology Behavioral Assessment*. 2001;23(4):253-263.
 17. Zigmond As, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*. 1983;67(6):361-370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>
 18. Oh SM, Min BJ, Park DB. A comparison of normal, depressed and anxious groups: A study on the standardization of the hospital anxiety and depressed scale for Koreans. *Journal of the Korean Neuropsychiatric Association*. 1999;38(2):289-296.
 19. Rosenberg M. *Society and the adolescent self image*. Princeton: Princeton University Press NJ; 1965. 347 p.
 20. The Nation Youth Policy Institute. Questionnaire of KCYPS (W1~W6) [Internet]. Sejong: The Nation Youth Policy Institute. 2015 [cited 2015 May 21]. Available from: http://archive.nypi.re.kr/brdartcl/boardarticleList.do?brd_id=BDIDX_k9Fd9oFi29nooCcj7kX1I4&srch_ctgry_idx=CTIDX00043&menu_nix=qZc474Ak
 21. Hilt LM, Nock MK, Lloyd-Richardson EE, Prinstein MJ. Longitudinal study of nonsuicidal self-injury among young adolescents: Rates, correlates, and preliminary test of an interpersonal model. *Journal of Early Adolescence*. 2008;28(3):43-69. <https://doi.org/10.1177/0272431608316604>
 22. Kiekens G, Bruffaerts R, Nock MK, Van de Ven M, Wittman C, Mortier P, et al. Non-suicidal self-injury among Dutch and Belgian adolescents: Personality, stress and coping. *European Psychiatry*. 2015;30(6):743-749. <https://doi.org/10.1016/j.eurpsy.2015.06.007>
 23. Aseltine RH, Gore SL. The variable effects of stress on alcohol use from adolescence to early adulthood. *Substance Use Misuse*. 2000;35(5):643-668. <https://doi.org/10.3109/10826080009148415>
 24. Tatnell R, Hasking P, Newman L, Taffe J, Martin G. Attachment, emotion regulation, childhood abuse and assault: Examining predictors of NSSI among adolescents. *Archives of Suicide Research*. 2016;11:1-11. <https://doi.org/10.1080/13811118.2016.1246267>
 25. Gratz KL, Conrad SD, Roemer L. Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry*. 2002;72(1):128-140.
 26. Gratz KL. Risk factors for and functions of deliberate self harm: An empirical and conceptual review. *Clinical Psychology: Science and Practice*. 2003;10(2):192-205.