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Factors Affecting Suicide Attempters Visiting Emergency Departments: Through a Focus on Acquired Capability with Rehearsal for Suicide, Negative Urgency, and Social Support

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This study examines how acquired capability for suicide, negative urgency, and social support effectuate a suicide attempt. Sixty-three adults having visited an emergency room due to a suicide attempt were studied. The results can be summarized as follows. First, there were no significant sex differences in acquired capability for suicide, negative urgency, and social support. Second, the correlation among suicidal ideation, acquired capability for suicide, negative urgency, social support, and suicide attempts was examined. Results showed that suicide attempts were significantly and positively correlated with suicide ideation, acquired capability for suicide, and negative urgency. However, social support and suicide attempts did not significantly correlate. Third, results of hierarchical regression analysis indicated that acquired capability for suicide and negative urgency significantly predicted suicide attempts even when suicide ideation was controlled, but social support did not significantly explain attempts. In other words, study results imply that suicide attempts increase when acquired capability for suicide and negative urgency are high. Study results offer empirical data for understanding the intrinsic characteristics of individuals attempting suicide.

Keywords Suicidal attempt; Negative urgency; Suicidal ideation; Social support; Acquired capability for suicide

INTRODUCTION

The number of suicide deaths in South Korea in 2017 was 12,463 and suicide rate was 24.3 people per 100,000 people. This is more than double the annual average of 12 suicide deaths in Organization for Economic Cooperation and Development (OECD) countries [1]. Although suicide-related behavior is preventable, identifying imminent risk is challenging because most people with known risk factors do not attempt suicide. Although the study on the mechanisms of explaining suicide attempts will greatly help to prevent suicide, it is less studied than other social phenomenon and especially in Korea, researches on suicide ideation are more focused than suicide attempt.

Joiner's interpersonal–psychological theory of suicidal behavior posits that an individual must exhibit elevations on three variables–perceived burdensomeness,

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thwarted belongingness, and the acquired capability for suicide–in order to enact lethal self-harm. He considered the concept of 'acquired capability for suicide' because not all suicides ideation lead to suicide attempt. Acquired capability for suicide is the ability to commit suicide and was first suggested in Joiner's theory of suicide. Before the suicide attempt, fear of death disappears and endurance of physical pain increases. He also said that learning this would lead to suicide attempt and acquired capability for suicide is an essential precondition for suicide attempts [2]. Since then, acquired capability for suicide has been studied as a mechanism to explain suicide attempts [3-5]. George et al. [3] developed the Acquired Capability with Rehearsal for Suicide Scale (ACWRSS) adding the item of preparation for suicide to previous acquired capability. New items were devised to capture direct means of acquiring capability via mental rehearsal and active planning. This new measure has the advantage of rating suicide risk objectively because it measures specific behaviors including preparation for suicide. Negative urgency, the tendency to act rashly in an attempt to reduce feelings of negative affect [6], appears to be a worthy of the investigation for the individual difference related to emotions that could theoretically alter the manner through which particular individuals develop increased suicide risk. In previous studies, negative urgency has been linked to mental illnesses with elevated suicide rates, including borderline personality disorder, substance use disorders, and antisocial personality disorder [7-9]. In addition, negative urgency has been linked to various problems including aggression [10]. Low-level social support was a risk factor for suicide attempt through psychological autopsy in a research that found the cause of suicide by interviewing the families of suicide victim aged 15-34 [11]. Disrupted social connectedness such as thwarted belongingness, and living alone were an important predictor of suicide attempts [12]. Korean psychological autopsy study on suicide victim in Cheonan, Chungcheongnam-do Mental Healthy Welfare Center reported that low social support was a factor predicting suicide attempts [13].

Thus far, however, no research has examined the role of emotion in this process or whether the interaction of these three variables is more problematic for certain populations than for others.

This study aimed to analyze the demographic and psychosocial characteristics and to examine whether suicide-related variables, including acquired capability with rehearsal for suicide, negative urgency and social supports by undertaking a hierarchical multiple regression analysis in suicide attempters who had been visited to emergency departments, could predict suicide attempt with control of suicide ideation in suicide attempters who visited to the emergency departments.

MATERIALS AND METHODS

1. Subjects and procedures

This study was conducted from July 2018 to May 2019, and the study was conducted on 63 suicide attempters aged 19 or older who visited at emergency departments. They were all suicide attempters appearing in emergency departments in the participating hospitals immediately after attempting suicide, excluding those who were incapable of communicating in Korean or died during emergency treatment. Research coordinators and interviewing psychiatrists had formal training sessions to share the study protocol and to receive interview training. Each interviewing psychiatrist performed a whole, formal, semi-structured interview with participants and their family members or guardians immediately after participants were medically stabilized during their stay in the emergency department. The study protocol was reviewed and approved by Institutional Review Boards of Soonchunhyang University Cheonan Hospital (IRB No. 2017-11-029). All subjects and caregivers received written and oral explanations regarding the study and provided written informed consent.

2. Measures

1) Scale for Suicide Ideation

The Scale for Suicide Ideation [14] is a 19-item self report measure designed to assess suicidal thoughts, plans, and intent to die by suicide. We used the Korean version of the SSI, which was adapted and validated by Shin et al. [15]. The first five items are screening items, and the last two are items assessing past attempts and intent. Each item's scoring ranges from 0 to 2 on a three-point scale, resulting in an overall score in the range of 0 to 38. The SSI has shown strong psychometric properties in previous studies. In interpreting the SSI's results, the higher the total score the greater the risk of future suicide. In adults, a score of 6 or more has been used as a

cutoff point for clinically significant suicidal ideation [16].

2) Columbia–Suicide Severity Rating Scale

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a semistructured clinical interview that quantitatively evaluates suicidal ideation and behavior in clinical and research environments [17]. We just used four questions, except for the 'self-mutilating' question with the Korean version of the C-SSRS. A higher score indicates greater severity.

3) Acquired Capability with Rehearsal for Suicide Scale

ACWRSS is a self-reporting questionnaire that measures acquired capability of suicide, developed by George et al. [3]. We used the Korean version of the ACWRSS, which was adapted and validated by Ryu and You [18]. A total of 7 questions composed of 3 sub-measurements: reduction of fear of death (2 questions), pain tolerance (2 questions), and readiness for suicide (3 questions). It is evaluated from 'totally disagree (0 point)' to 'totally agree (8 points)' on a nine-point scale. A higher score indicates greater acquired capability with rehearsal for suicide

4) Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency

Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency [6] is a 45-item self-response scale that features four components of impulsive behavior: Negative Urgency, Sensation Seeking, (lack of) Premeditation, and (lack of) Perseverance. The Negative Urgency subscale consists of twelve items measuring the degree to which an individual acts rashly when upset in order to reduce negative affect (e.g., I often make matters worse because I act without thinking when I am upset), each of which uses a Likert type scale ranging from 1 ("Not true of me") to 5 ("Very true of me"). We just used 12 items of the Korean version of the Negative Urgency subscale, which was adapted and validated by Lim and Lee [19].

5) Multi Dimensional Scale of Perceived Social Support

Multi Dimensional Scale of Perceived Social Support (MSPSS) is a self-reporting questionnaire that measures social support and was developed by Zimet et al. [20]. We used the Korean version of the MSPSS. A total of 12 items composed of 3 subscales : family support (4 items), friends support (4 items), and significant others support (4 items). On a 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). A higher score indicates greater the social support.

3. Statistical analysis

In the comparison of the demographic and clinical characteristics, continuous variables were analyzed using t-tests, and categorical variables were analyzed using χ^2-tests. To examine the associations among suicide ideation, ACWRSS, negative urgency, and social support, the Pearson correlation analysis were performed. In order to control the potential effects of suicide ideation, two sets of three separate hierarchical multiple regression analyses were conducted for 3 variables including ACWRSS, negative urgency, and social support.

RESULTS

1. Demographic and clinical characteristics

A total of 63 suicide attempters (28 male and 35 female) enrolled from July, 2018 to May, 2019. The mean age of subjects were 31.75±14.09 years (Table 1). There were no significant differences in age and sex.

2. Comparisons between sex of suicide attempters

No statistical differences between male and female were found in suicide ideation, ACWRSS , negative urgency, social support and suicide severity (Table 2).

3. Correlations among suicide ideation, ACWRSS, negative urgency, social support and suicide severity

Suicide ideation showed a significant positive correlation with suicide severity, ACWRSS and negative urgency. There was a significant negative correlation between suicide ideation and social support. ACWRSS has also shown a significant positive correlation with negative urgency and suicide severity. Negative urgency showed a significant positive correlation with suicide severity. Social support was not associated with ACWRSS, nega-

Table 1. Characteristics of suicide attempters

Characteristics	Value (n=63)
Sex	
Male	28 (44.4)
Female	35 (55.6)
Age (y)	
10s	4 (6.3)
20s	25 (39.7)
30s	11 (17.5)
40s	9 (14.3)
50s	9 (14.3)
60s	5 (7.9)
Marital states	
Not married	31 (49.2)
Married	23 (36.5)
Divorced	5 (7.9)
Separated	3 (4.8)
Bereaved	1 (1.6)
Educations	
Less than primary school	1 (1.6)
Primary school	2 (3.2)
Middle school	4 (6.3)
High school	47 (74.6)
College or higher	9 (14.3)
Living statuses	
Not alone	50 (79.4)
Alone	13 (20.6)
Employment statuses	
Employed	34 (54.0)
Unemployed	29 (46.0)
Methods of suicide attempts	
Ingestion	46 (73.0)
Hanging	3 (4.8)
Jumping	2 (3.2)
Cutting	5 (7.9)
Others	7 (11.1)

Values are presented as number (%).

Table 2. Comparisons between sex of suicide attempters (n=63)

Variable	Male (n=28)	Female (n=35)	t
SSI	0.92±0.43	0.98±0.51	−0.466
ACWRSS	4.28±1.53	4.10±2.10	0.381
UPPS-P	2.78±0.66	2.60±0.78	0.966
MSPSS	3.27±0.89	2.96±0.79	1.416
C-SSRS	0.83±0.75	0.87±0.75	−0.168

Values are presented as mean±standard deviation.
SSI, Scale for Suicide Ideation; ACWRSS, Acquired Capability with Rehearsal for Suicide Scale; UPPS-P, Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency; MSPSS, Multi Dimensional Scale of Perceived Social Support; C-SSRS, Columbia-Suicide Severity Rating Scale.

tive urgency, suicide severity (Table 3).

4. Hierarchical multiple regression analyses for suicide severity associated with suicidal ideation, ACWRSS, negative urgency, and social support

An influence of suicidal ideation and ACWRSS on suicide severity are displayed in Table 4. In order to control the potential effects of suicidal ideation, two sets of three separate hierarchical multiple regression analyses were conducted. Suicidal ideation was entered in the first step followed by each single variable in the second step in all the analyses. In the first step, suicidal ideation accounted for 25.1% of suicide severity, and the higher suicidal ideation score indicates greater suicide severity. After ACWRSS was entered in the second step, the additional injection of ACWRSS in Step 2 increased the ability to explain suicide severity by 11.7%, and the ACWRSS significantly explained suicide severity with control of suicidal ideation (β=0.476, $p<0.01$). In other words, the ACWRSS was a significant explanation of suicide severity even when the influence of suicide ideation was controlled.

An influence of suicidal ideation and negative urgency on suicide severity are displayed in Table 5. In the first step, suicidal ideation accounted for 26.5% of suicide severity, and the higher suicidal ideation score indicates greater suicide severity. After negative urgency was entered in the second step, the additional injection of negative urgency in Step 2 increased the ability to explain suicide severity by 12.4%, and the negative urgency significantly explained suicide severity with control of suicidal ideation (β=0.385, $p<0.01$). In other words, the negative urgency was a significant explanation of suicide severity even when the influence of suicide ideation was controlled.

An influence of suicidal ideation and social support on suicide severity are displayed in Table 6. In the first step, suicidal ideation accounted for 26.5% of suicide severity, and the higher suicidal ideation score indicates greater suicide severity. After social support was entered in the second step, the additional injection of social support in Step 2 did not increase the ability to explain sui-

Table 3. Correlations among suicide ideation, acquired capability for suicide, negative urgency, social support and suicide severity (n=63)

Variable	1	2	3	4	5
1. SSI	1				
2. ACWRSS	0.69**				
3. UPPS-P	0.40**	0.50**			
4. MSPSS	−0.31*	−0.07	−0.20		
5. C-SSRS	0.51**	0.59**	0.53**	−0.19	1

SSI, Scale for Suicide Ideation; ACWRSS, Acquired Capability with Rehearsal for Suicide Scale; UPPS-P, Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency; MSPSS, Multi Dimensional Scale of Perceived Social Support; C-SSRS, Columbia-Suicide Severity Rating Scale.
*p<0.05, **p<0.01.

Table 4. Hierarchical multiple regression analyses for suicide severity associated with suicidal ideation and ACWRSS (n=63)

Variable	Step 1			Step 2		
	B	SE	β	B	SE	β
SSI	0.784	0.175	0.501***	0.266	0.225	0.170
ACWRSS				0.190	0.057	0.476**
	$R^2\Delta$=0.251, R^2=0.251***			$R^2\Delta$=0.368, R^2=0.117**		

SSI, Scale for Suicide Ideation; ACWRSS, Acquired Capability with Rehearsal for Suicide Scale.
**p<0.01, ***p<0.001.

Table 5. Hierarchical multiple regression analyses for suicide severity associated with suicidal ideation and negative urgency (n=63)

Variable	Step 1			Step 2		
	B	SE	β	B	SE	β
SSI	0.798	0.170	0.515***	0.557	0.171	0.359**
UPPS-P				0.392	0.112	0.385**
	$R^2\Delta$=0.265, R^2=0.265***			$R^2\Delta$=0.389, R^2=0.124**		

SSI, Scale for Suicide Ideation; ACWRSS, Acquired Capability with Rehearsal for Suicide Scale; UPPS-P, Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency.
**p<0.01, ***p<0.001.

Table 6. Hierarchical multiple regression analyses for suicide severity associated with suicidal ideation and social support (n=63)

Variable	Step 1			Step 2		
	B	SE	β	B	SE	β
SSI	0.798	0.170	0.515***	0.782	0.181	0.504***
MSPSS				−0.030	0.103	−0.034
	$R^2\Delta$=0.265, R^2=0.265***			$R^2\Delta$=0.266, R^2=0.001		

SSI, Scale for Suicide Ideation; UPPS-P, Urgency, Premeditation, Perseverance, Sensation seeking, Positive urgency.
**p<0.01, ***p<0.001.

cide severity and the social support did not significantly explain suicide severity(β=−0.034, ns).

DISCUSSION

This study analyzed the demographic and psychosocial characteristics and examined whether suicide-

related variables, including ACWRSS, negative urgency and social supports could predict suicide attempt with control of suicidal ideation in 63 suicide attempters who were visited to the emergency departments at Soonchunhyang University Cheonan Hospital.

To our knowledge, this is the first study performing hierarchical multiple regression analyses to determine the potential effects of ACWRSS, negative urgency, and social support for those who were immediately followed by the suicide attempt.

First, contrary to previous studies [21,22], there were no statistical differences between male and female in suicide ideation, ACWRSS, negative urgency, social support and suicide severity. While previous studies included just adolescents or young adults, this study included all ages from 10s to 60s. Therefore, further studies including suicide attempters of various ages are needed.

Secondly, we found suicidal ideation, ACWRSS, and negative urgency were positively associated with the suicidal severity. This study's findings were in line with previous study that reported that suicidal ideation, ACWRSS, and negative urgency were positively associated with the suicide severity [3,23]. These findings indicate that, individuals exhibiting high levels of suicidal ideation, ACWRSS and negative urgency may be dangerous, as they might be more likely to quickly develop suicidal ideation and resort to painful self-harming behaviors while experiencing negative affective states. However, we did not find the significant association between social support and suicidal severity. This finding was in line with Kim and Park's study [21], according to which, the factor affecting adolescent's suicidal attempt were suicidal thoughts and depression, but not support from friends, family and teachers. In the present study, we examined the individuals immediately followed by the suicide attempt. They are usually in a state of great psychological confusion. Under these conditions, it is possible that you will not be able to objectively report their social support system.

Thirdly, ACWRSS had additional explanation power beyond suicide ideation for suicide attempts. In other words, ACWRSS provided significant contributions to explaining suicide severity variance than suicide ideation, consistently with the previous study [2,18]. These indicated that people who act on their suicidal desires have a higher level of self-perception of acquired capability of suicide, and they tend to engage in planning activities using mental rehearsal strategies. In a Korean Nationwide Study [24], the lifetime prevalence of suicide ideation, plan, and attempt in South Korea was 15.2%, 3.3%, and 3.2%, respectively. These findings showed suicide ideation is not enough to predict suicide attempts.

Fourthly, negative urgency also had additional explanation power beyond suicide ideation for suicide attempts. Consistent with the findings of this study, individuals exhibiting high levels of negative urgency, as they might be more likely to quickly develop suicidal ideation and resort to painful self-harming behaviors while experiencing negative affective states [23]. The more interpersonal difficulties and negative urgency are the more predictable for suicide attempts. In Korean studies, negative urgency was reported as a factor that distinguishes suicide ideation group form suicide attempt group, suggesting that temperamental tendency to act impulsively when negative emotions are more likely to related to suicide attempt group than suicide ideation group [18]. Emotion regulation difficulties were associated with increased risk for making a past-year suicide attempt, above and beyond the effects of depressive symptoms and demographic factors [25]. Given all this, failure to regulate effectively negative urgency can increase the likelihood of impulsively attempting suicide.

Finally, social support did not have additional explanation power beyond suicide ideation for suicide attempts. Unlike the present study, You et al. [12] found the most consistent support for the relationship between suicide ideation and suicide attempts and belongingness, which is the form of social connectedness posited by the interpersonal theory of suicide to be a key factor in desire for suicide. Although they examined 814 participants recruited from 4 residential substance-use treatment programs and completed self-report measures of whether they had ever thought about or attempted suicide, we examined 63 suicide attempters who were visited to the emergency departments. Harter et al. [26] suggested social support may be a variable that indirectly predicts suicide attempts through depression, hopelessness, impulsiveness, rather than directly explaining suicide attempts. In this study, social support was significantly negative correlated with suicide ideation and the decrease of social support increases suicide ideations. Increased suicide ideations can predict suicide attempts through ACWRSS, and negative urgency.

This study has some limitations First, the use of a rela-

tively small sample size and skewed age ratios may have limited the generalization of our results, particularly since suicide attempters is observed mainly in 20s. Further studies with a larger number of all age groups will need to confirm this finding. Second, the previous study [23] tested hypothesis that the four-way interaction of negative urgency, perceived burdensomeness, thwarted belongingness, and the ACWRSS would predict lifetime number of suicide attempts, controlling for biological sex and depression with a hierarchical linear regression equation. They suggested negative urgency was an amplifier of the relationship between components of the interpersonal–psychological theory of suicidal behavior and lifetime number of suicide attempts. However, we did not examine the interaction of suicide ideations, negative urgency, and ACWRSS. Further research will need to further analyze the relationship between these variables.

The main strength of the present study is as follows. First, we examined the individuals immediately followed by the suicide attempt in the hospital. Because the previous studies mainly examined acquired capability for suicide and negative urgency for nonclinical subjects, there were some limitations to examining the effect on actual suicide attempts. Second, in hierarchical regression analysis, although suicide ideation, the most powerful predictor of suicide attempts was controlled, the ACWRSS and negative urgency were identified as factors that significantly explain suicide severity. In this study, although suicide ideation was an important variable in predicting suicide attempts, the ACWRSS and negative urgency had additional predictive power beyond suicide ideation. Third, it is expected to contribute to the development of suicide prevention and therapeutic intervention strategies for individuals who show high ACWRSS and negative urgency. Therefore we can recommend a program that include assessment for fearlessness of death, pain tolerance, preparation for suicide and effective regulation for negative emotions and destructive impulsive behavior by our study result.

CONCLUSION

In this study, we found suicidal ideation, acquired capability with rehearsal for suicide, and negative urgency were positively associated with the suicidal severity. Furthermore, acquired capability with rehearsal for suicide had additional explanation power beyond suicide ideation for suicide attempts. Negative urgency also had additional explanation power beyond suicide ideation for suicide attempts. In other words, acquired capability with rehearsal for suicide and negative urgency provided significant contributions to explaining suicide severity variance than suicide ideation. Therefore, these results would offer an empirical data for understanding the intrinsic characteristics of individuals attempting suicide and would be useful in the prevention of suicide attempts in individuals with suicidal ideation.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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