ORIGINAL ARTICLE
https://doi.org/10.30773/pi.2020.0102
Print ISSN 1738-3684 / On-line ISSN 1976-3026
OPEN ACCESS

Defense Mechanisms and Psychological Characteristics According to Suicide Attempts in Patients with Borderline Personality Disorder

Young-Ji Lee[1], Mu-Sung Keum[2], Hye-Geum Kim[2], Eun-Jin Cheon[2], Young-Chul Cho[3], and Bon-Hoon Koo[2] ✉

[1]Department of Psychiatry, Gyeongsang National University Changwon Hospital, Changwon, Republic of Korea
[2]Department of Psychiatry, College of Medicine, Yeungnam University, Daegu, Republic of Korea
[3]Daedong Hospital, Daegu, Republic of Korea

Objective There have been many biological studies on suicide behaviors of borderline personality disorder (BPD), however few studies have sought to psychoanalytic characteristics including defense mechanisms. Therefore, we investigated psychological, symptomatic, and personality characteristics including defense mechanisms in suicide attempters and non-suicide attempters among patients with BPD.

Methods We enrolled 125 patients with BPD. Forty-two patients with a history of one or more suicide attempts formed the suicide attempters group and 83 patients with no such history formed the non-suicide attempters group. We collated the differences in clinical and psychological characteristics between the two groups by using the Symptom Checklist-90-Revised (SCL-90-R), the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), the Personality Disorder Questionnaire-4+ (PDQ-4+), and the Defense Style Questionnaire (DSQ).

Results The suicide attempters group scored higher on the hostility subscale of SCL-90-R. The suicide attempters group also scored higher on the Infrequency, Back Infrequency, Lie, Masculinity-femininity, Paranoia, Psychasthenia, and Schizophrenia scales of the MMPI-2. The incidence of paranoid and antisocial personality disorders, as assessed by the PDQ-4+, was significantly different in both groups. Maladaptive, self-sacrificing defense style, splitting and affiliation on the DSQ were also higher for the suicide attempters group. In the results of the logistic regression analysis, gender, the F(B) and L scales on the MMPI-2, and 'splitting of other's image' defense mechanism on the DSQ were the factors that significantly influenced to suicide attempts.

Conclusion These findings suggest that impulsive psychiatric features and maladaptive defense style may be related to suicidal risk in patients with BPD. Therefore, our findings may help clinicians in estimating the risk of suicide in patients with BPD.

Psychiatry Investig 2020;17(8):840-849

Key Words Borderline personality disorder, Psychological characteristics, Defense mechanism, Suicide attempt.

INTRODUCTION

Over 800,000 people die due to suicide every year, which is one person every 40 seconds. Based on current trends and WHO estimates for 2020, the global annual suicide fatalities could rise to approximately 1.53 million. Globally, suicide is one of the three leading causes of death among those aged 15−44 years and was ranked as the second leading cause of death among 15−29 year olds in 2012.[1,2] In South Korea, suicide rates (per 100,000 deaths) increased from 13.6 in 2000 to 25.6 in 2016.[3] This is well above the suicide rate of 12.0 per 100,000 deaths for countries of Organization for Economic Cooperation and Development (OECD) from 2012 to 2015, and is the highest among the OECD countries. South Korea had the second highest suicide rate in the world in 2015.[4]

It is known that the major risk factors for suicide are prior suicide attempts and depression.[5,6] Depressive disorder is the most common psychiatric disorder and its prevalence also affects the overall burden of the disease.[7,8] The suicide mortality rate in patients with depressive disorder is higher than the general population because patients with depressive disorder are more likely to attempt suicide using more fatal methods.[9,10] The risk factors of suicide in patients with depressive disorder include severity of depression, comorbidity with personality dis-

Received: May 19, 2020 **Revised:** May 22, 2020
Accepted: June 18, 2020

✉ **Correspondence:** Bon-Hoon Koo, MD, PhD
Department of Psychiatry, College of Medicine, Yeungnam University, 170 Hyeonchung-ro, Nam-gu, Daegu 42415, Republic of Korea
Tel: +82-53-620-3340, **Fax:** +82-53-629-0256, **E-mail:** vijnana@chol.com

order, substance use disorder, etc.[11] Depressive disorder is frequently comorbid with borderline personality disorder (BPD). Previous findings state 40% of the inpatients with depression at a mental hospital in the USA were also reported to have BPD.[12]

BPD is the most common personality disorder with a lifetime prevalence of 10% in the patients at the American Psychiatric Outpatient Clinic.[13] BPD is characterized by impulsiveness, aggressiveness, the use of primitive defense mechanisms such as splitting, projective identification, and denial, and engaging in self-harm and suicide attempts. Hence, this makes BPD a difficult disorder to treat.[14,15] BPD is the only personality disorder that includes suicide attempt or self-harm behavior in the diagnostic criteria.[16] Previous research on suicide attempts in patients with BPD revealed a suicide rate of 10%, which is about 50 times higher than the suicide rate of the normal population.[17] Moreover, patients with comorbid depressive disorder and BPD have a higher mortality rate than patients with only depressive disorder since the former tend to attempt suicide using more lethal ways.[18] The government of Netherlands estimated to spend approximately €87.5 million annually for suicide in patients with BPD.[19]

Worldwide, the demand for suicide prevention continues to increase due to the increasing deaths by suicide and burden of associated social costs. Therefore, researchers have extensively studied the risk factors and prevention of suicide. In clinical settings, various attempts have been made as well to identify the risk factors for suicide.[20-22] A study based on the association between suicide and defense mechanisms revealed that the use of immature defenses such as passive-aggression, somatization, and projection was highly associated with suicide.[23] Psychiatric interview, self-report psychological tests, and clinician's evaluation scales have been used to identify the psychological characteristics of suicide attempters. Each method has advantages and disadvantages. Whereas psychiatric interview is able to obtain more in-depth information, self-report psychological tests is simple, more economical, and easier to open up their subjective feelings.[24] Self-report psychological tests have been extensively used in studies investigating the psychological characteristics of suicide attempters with depression.[24,25]

However, despite the high prevalence and high association with suicide, research on BPD has been mainly limited to biological causes, medication, and psychotherapy.[26,27] There have been few studies on defense mechanisms, and psychological characteristics associated with suicide attempt in patients with BPD. Therefore, we investigated psychological, symptomatic, and personality characteristics including defense mechanisms in suicide attempters and non-suicide attempters among patients with BPD using self-report psychological tests.

METHODS

Participants

The subjects were drawn from a pool of 18−65 year old inpatients and outpatients being treated at the psychiatric department of a Korean university hospital from October 2006 to December 2016. Patients who had filled the Symptom Checklist-90-Revised (SCL-90-R), the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), the Personality Disorder Questionnaire-4+ (PDQ-4+), and Defense Style Questionnaire (DSQ) were shortlisted. The preliminary data sheets included the basic demographic data, comorbid conditions, the number and methods of suicide attempts, life stress, and other clinical data needed to conduct this study. All included patients met the criteria for BPD as per the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) and Diagnostic and Statistical Manual of Mental Disorder, 4th edition, test-revised (DSM-IV-TR).[28,29] Patients with other personality disorders, intellectual disability, pervasive developmental disorder, autism spectrum disorder, psychotic features, and secondary psychiatric problem caused by organic problem or medications were excluded. Primary diagnoses were made on the basis of clinical assessments conducted by an experienced, board certified psychiatrist, which was then re-evaluated during an investigators' meeting with four psychiatrists with chart review. Diagnoses and inclusion of the patients were then confirmed in this meeting. Finally, 125 patients with BPD were included in the sample. Forty-two patients with a history of one or more suicide attempts formed the suicide attempters group, while the remaining 83 patients with no history of suicide attempt formed the non-suicide attempters group. Since this was a retrospective study, it is exempted from obtaining participants' consent. This study was reviewed and approved by the Institutional Review Board of the university hospital (YUMC 2015-12-020).

Assessments and measures

The SCL-90-R is a self-reporting, multidimensional, 90-item questionnaire consisting of nine symptom scales and three global scales.[30] Each item represents a psychological symptom, and each response ranges from not at all (0), a little bit (1), moderately (2), quite a bit (3), and extremely (4). Nine symptom scales consist of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The global indexes are scores obtained by dividing total score by the total number of items. The global indexes consist of a general symptomatic index (GSI), a positive symptom total, and a positive symptom distress index.[31-33] The mean score of the GSI for functional population is 0.33, and the cutoff score between the functional and the moderately symptomatic is 0.60.[34] The SCL-90-R is a tool which

can be easily performed by non-experts within 20 minutes. Research has documented high reliability and validity of the SCL-90-R.[35] The Korean version of the SCL-90-R was used in this study.[36,37]

The MMPI was the first tool to objectively measure abnormal behavior and to classify psychiatric diagnosis. The MMPI-2, revised in 1989 by Butcher et al.,[38] consists of a total of 576 questions. The MMPI-2 has been widely used in various fields including clinical settings.[39] The Korean version of the MMPI-2, standardized for the Korean population, was used in the current study.[40] Validity scales, are used to evaluate the examinee's attitude in terms of consistency in responses (VRIN and TRIN scales), under-reporting trends (L, K, and S scales), and over-reporting trends [F, F(B), F(P) scales]. The clinical scales are used to examine the status and severity of psychiatric symptoms, and personal characteristics. They consist of Hypochondriasis (Hs), Depression (D), Hysteria (Hy), Psychopathic deviate (Pd), Masculinity-femininity (Mf), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Hypomania (Ma) and Social introversion (Si). Clinical scales except Mf and Si use uniform T scores. Clinical scales generally interpret scales with high T scores above 70, and scales with too low T scores and typically analyze the shapes of scales rather than single scale scores. In this study, the validity scales and 10 clinical scales of the MMPI-2 were used to identify the differences in psychological characteristics between suicide attempters and non-suicide attempters among patients with BPD.

The PDQ-4+ was developed by Hyler et al.,[41] to evaluate personality disorders. The PDQ-4+, a 99-item self-report questionnaire, is based on the DSM-IV criteria for personality disorders. The Korean version of PDQ-4+ standardized in Korea by Kim et al.[42] was used in this study. The PDQ-4+ is designed to evaluate 12 personality disorders, including depressive personality disorder and negativistic personality disorder outlined in the appendix of DSM-IV, which were previously not included in the PDQ-4. All questions are true-false type (yes/no) and 'yes' means a pathological reaction. It includes four 'too good' questions to prevent subjects from undermining problems and two 'suspect questions' to figure out whether subjects are lying, or answering without sincerity. Except for the four 'too good' and the two 'suspect questions', a response of 'yes' to remaining 93 questions are regarded as pathological responses and counted as 1 point each. More than 3 points in each category of personality disorder indicates signs of specific personality disorder. Total score of normal people is usually 20 points or less, and total score of 30 or more usually highlight signs of personality disorders.[42]

The DSQ, designed by Bond and Vaillant in 1986, is a self-reporting test measuring defense mechanisms.[43] The DSQ consists of 78 items that describe the conscious outgrowth of various defense mechanisms and 11 false items. The DSQ showed high validity and reliability and is widely used in the study of dynamic theory of personality. According to the DSQ, the defense styles consists of several defense mechanisms, which are classified into maladaptive, image-distorting, self-sacrificing and adaptive defense types according to the maturity of the defense. The DSQ also measures specific defense mechanisms such as projection and displacement.[44]

Statistical analysis

Demographic data for both the groups was analyzed using frequency and descriptive analyses. Since the frequency analysis revealed a significant difference in gender between both groups, the multivariate analysis for the scores on SCL-90-R, MMPI-2, PDQ-4+, and DSQ was performed keeping gender constant. Clinical variables and psychological characteristics including comorbid conditions affecting suicide attempts were analyzed by binary logistic regression analysis. All statistical analyses were performed on IBM SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). Statistical significance was indicated by $p<0.05$.

RESULTS

Demographic and clinical characteristics

Data for 125 subjects diagnosed with BPD at a Korean university hospital was analyzed. Table 1 and 2 summarize the demographic and clinical characteristics of the subjects. The analysis of the demographic data (Table 1) revealed a significantly higher number of females in the suicide attempters group. The analysis of the clinical characteristics (Table 2) for both groups revealed the highest comorbidity of BPD with depressive disorder. The methods of attempting suicide included the use of tools (15), intoxication (14), hanging (6), falling down (4), and others (2). Four patients did not respond. Among the suicide attempters group, 28 patients attempted suicide once, 7 patients attempted suicide twice, and 7 patients attempted suicide 3 or more times.

Psychological characteristics and defense mechanisms

SCL-90-R

As compared to the non-suicide attempters group, the suicide attempters group scored significantly higher on the hostility and the paranoid ideation subscales (p=0.021, p=0.038) (Table 3).

MMPI-2

The suicide attempters group scored significantly higher on the F, F(B), and L validity scales (p=0.026, p=0.003, p=0.001)

and significantly lower on the S validity scale (p=0.037) in comparison to the non-suicide attempters group. The suicide attempters group scored significantly higher on the Pa, Pt, and Sc clinical scales (p=0.025, p=0.011, p=0.024) and significantly lower in the Mf clinical scale (p=0.002) as compared to the non-suicide attempters group (Table 4, Figure 1).

Table 1. Demographic and clinical characteristics in both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	Total (N=125)	χ^2 or t	p-value
Age	27.97±8.52	29.38±10.43	28.39±9.18	-0.806	0.422
Sex				10.465	0.001
Male	45 (54.2)	10 (23.8)	55 (43.7)		
Female	38 (45.8)	32 (76.2)	70 (56.3)		
Marital status				0.834	0.841
Unmarried	53 (63.9)	24 (57.1)	77 (61.6)		
Married, digamy	16 (19.3)	10 (23.8)	26 (20.8)		
Divorced, separated	5 (6.0)	2 (4.8)	7 (5.6)		
No response	9 (10.8)	6 (14.3)	15 (12.0)		
Academic background				6.091	0.237
Elementary school	1 (1.2)	1 (2.4)	2 (1.6)		
Middle school	1 (1.2)	0 (0.0)	1 (0.8)		
High school	20 (24.1)	5 (11.9)	25 (20.0)		
University	25 (30.1)	10 (23.8)	35 (28.0)		
Graduate school	1 (1.2)	0 (0.0)	1 (0.8)		
No response	35 (42.2)	26 (61.9)	61 (48.8)		
Life events				2.935	0.087
No	34 (41.0)	24 (57.1)	58 (46.4)		
Yes	49 (59.0)	18 (42.9)	67 (53.6)		

Values are presented as mean±SD or number (%). SD: standard deviation, NSA: non-suicide attempters, SA: suicide attempters

Table 2. Comorbidities in both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	Total (N=125)	χ^2 or t	p-value
Comorbidity (axis I)				1.030	0.310
No	4 (4.8)	4 (9.5)	8 (6.4)		
Yes	79 (95.2)	38 (90.5)	117 (93.6)		
Comorbidities (axis-I)				16.900	0.089
Anxiety disorders	9 (10.7)	0 (0.0)	9 (7.1)		
Bipolar and related disorders	6 (7.2)	1 (2.4)	7 (5.6)		
Depressive disorders	34 (41.0)	23 (54.8)	57 (45.6)		
Disruptive, impulse-control and conduct disorders	2 (2.4)	0 (0.0)	2 (1.6)		
Dissociative disorders	0 (0.0)	1 (2.4)	1 (0.8)		
Gender dysphoria	1 (1.2)	0 (0.0)	1 (0.8)		
Attention deficit/hyperactivity disorders	2 (2.4)	0 (0.0)	2 (2.4)		
Tic disorders	1 (1.2)	0 (0.0)	1 (1.2)		
Obsessive-compulsive and related disorders	4 (4.8)	0 (0.0)	4 (3.2)		
Somatic symptom and related disorders	2 (2.4)	4 (9.5)	6 (4.8)		
Substance related disorders	6 (7.1)	4 (9.5)	10 (7.9)		
Trauma and stressor related disorders	12 (14.5)	4 (9.5)	16 (12.8)		

Values are presented as number (%). NSA: non-suicide attempters, SA: suicide attempters

PDQ-4+

The suicide attempters group scored significantly higher on paranoid personality disorder (p=0.033) and significantly lower in antisocial personality disorder in comparison to the non-suicide attempters group (p=0.012) (Table 5).

DSQ

The suicide attempters group scored significantly higher on maladaptive, self-sacrificing and adaptive defense styles than the non-suicide attempters group (p=0.006, p=0.033, p=0.045). The suicide attempters group also scored higher on splitting,

Table 3. Mean, SD, F scores of SCL-90-R for both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	F	p-value
Somatization	1.39±1.74	1.74±0.95	2.162	0.120
Obsessive-compulsive	2.00±0.90	2.19±0.84	2.065	0.131
Interpersonal sensitivity	1.79±1.06	1.94±0.85	2.590	0.079
Depression	2.15±1.08	2.59±0.83	2.762	0.067
Anxiety	1.71±1.08	2.02±0.86	2.423	0.093
Hostility	1.90±1.22	2.11±0.97	3.989	0.021
Phobic anxiety	1.20±1.09	1.18±0.84	2.193	0.116
Paranoid ideation	1.52±1.07	1.75±0.92	3.355	0.038
Psychoticism	1.42±0.93	1.55±0.81	0.710	0.494
General symptom index	1.70±0.93	1.96±0.71	2.624	0.077
Positive symptom total	63.90±21.57	71.12±14.07	2.291	0.105
Positive symptom distress level	2.23±0.72	2.43±0.60	2.727	0.069

Values are presented as mean±SD. SCL-90-R: Symptom Checklist-90-Revised, SD: standard deviation, NSA: non-suicide attempters, SA: suicide attempters

Table 4. Mean, SD, F scores of MMPI-2 for both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	F	p-value
Validity scale				
VRIN	41.94±8.11	43.00±7.98	0.933	0.396
TRIN	55.13±4.54	56.62±5.45	1.294	0.278
F	59.33±14.43	61.64±12.00	3.775	0.026
F(B)	60.78±14.46	66.29±10.06	6.247	0.003
F(P)	51.06±11.39	53.90±9.45	3.071	0.050
L	41.02±6.55	44.24±8.28	7.102	0.001
K	40.48±8.51	38.67±6.37	2.195	0.116
S	39.83±9.24	37.79±7.29	3.374	0.037
Clinical scale				
Hypochondriasis	58.43±11.51	61.55±10.69	1.890	0.155
Depression	66.37±14.28	64.76±12.38	0.765	0.468
Hysteria	59.01±9.40	60.36±8.23	0.809	0.448
Psychopathic deviate	65.42±11.78	62.33±10.72	1.659	0.195
Masculinity-femininity	50.40±11.49	49.26±9.61	6.613	0.002
Paranoia	64.28±16.01	67.43±14.29	3.804	0.025
Psychasthenia	65.30±15.39	67.60±11.91	4.720	0.011
Schizophrenia	62.70±14.68	65.26±11.48	3.853	0.024
Hypomania	54.23±11.50	57.48±12.57	2.522	0.084
Social introversion	61.93±15.26	62.17±13.87	2.143	0.122

Values are presented as mean±SD. MMPI-2: Minnesota Multiphasic Personality Inventory-2, SD: standard deviation, NSA: non-suicide attempters, SA: suicide attempters, VRIN: variable response inconsistency, TRIN: true response inconsistency, F: infrequency, F(B): back infrequency, F(P): infrequency psychopathology, L: lie, K: correction, S: superlative self-presentation

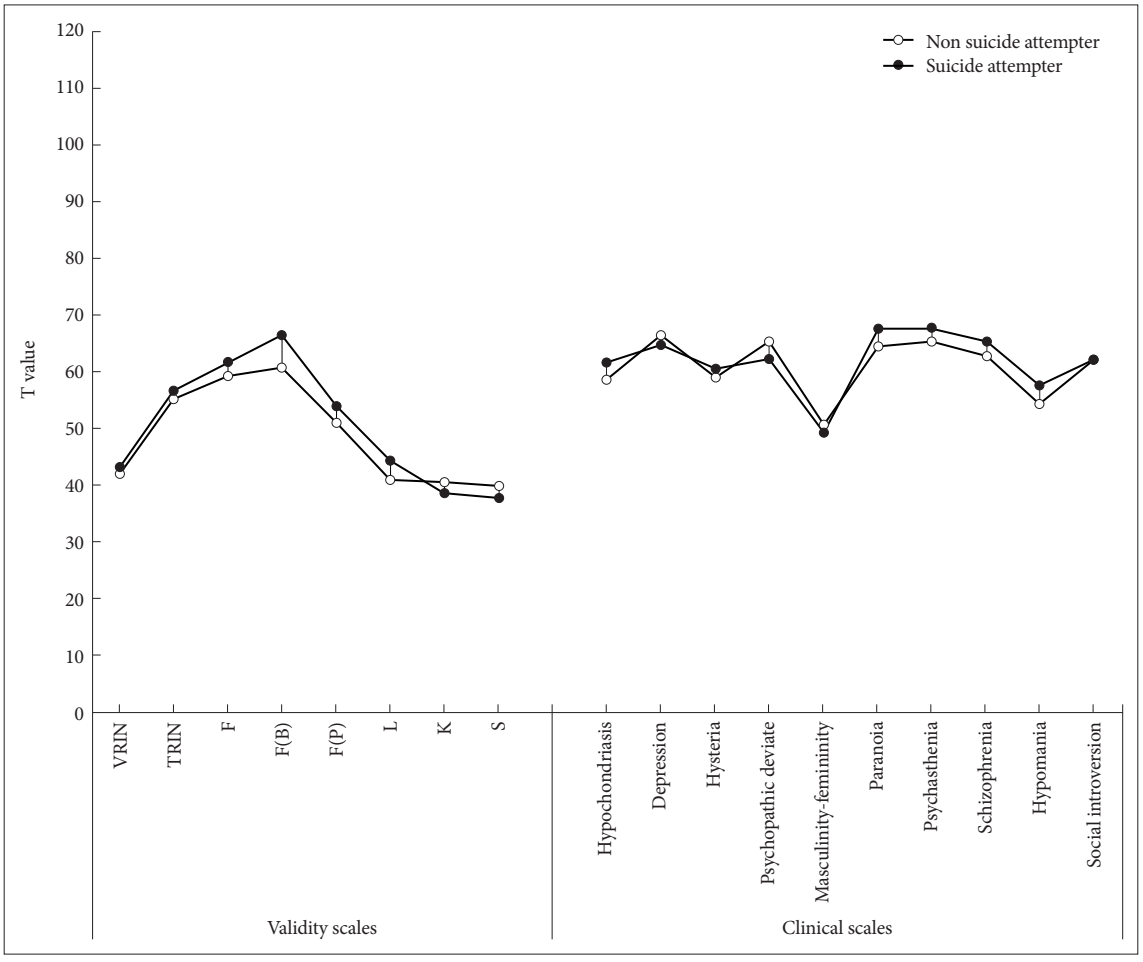

Figure 1. Mean profiles of MMPI-2. MMPI-2: Minnesota Multiphasic Personality Inventory-2, VRIN: variable response inconsistency, TRIN: true response inconsistency, F: infrequency, F(B): infrequency back, F(P): infrequency psychopathology, L: lie, K: correction, S: superlative self-presentation.

projective identification, and affiliation defense mechanisms than the non-suicide attempters group (p=0.021, p=0.005, p=0.003) (Table 6).

Regression analysis of clinical characteristics and psychological tests in the suicide attempters group

Factors that significantly influenced the tendency to attempt suicide were gender (p=0.006), the F(B) (p<0.001) and L (p=0.008) scales on the MMPI-2, and 'splitting of other's image' defense mechanism on the DSQ (p=0.043) (Table 7). Females were 3.799 times more likely to attempt suicide than males. The number of suicide attempts increased by 1.067 times as the T score of F(B) on the MMPI-2 increased by 1, and the number of suicide attempts increased by 1.160 times as 'splitting of other's image' defense mechanism on the DSQ increased by 1. The classification accuracies for these factors were 41.5% for the suicide attempters group, 87.8% for the non-suicide attempters group, and 72.4% for both groups combined.

DISCUSSION

This study aimed to investigate the differences in defense mechanisms, clinical symptoms, and psychological characteristics between suicide attempters and non-suicide attempters among patients with BPD.

The analysis of the demographic and clinical characteristics of the subjects showed a difference in terms of gender between the suicide attempters group and non-suicide attempters group. The proportion of females in the suicide attempters group was significantly higher, remaining consistent to the phenomenon that the worldwide suicide mortality was higher among males and suicide attempt rates were higher in females.[45,46] In addition, this result confirms the finding that females have a higher tendency to attempt suicide and to use more diverse methods than males among patients with BPD.[14] Hence, the statistical analysis was performed keeping the effect of gender differences between the two groups controlled. There was no significant difference between the suicide attempters group and non-sui-

Table 5. Mean, SD, F scores of PDQ-4+ for both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	F	p-value
Paranoid PD	3.96±1.85	4.76±1.32	3.507	0.033
Schizoid PD	3.36±1.67	3.78±1.34	1.200	0.305
Schizotypal PD	4.11±2.33	4.78±1.88	2.869	0.061
Antisocial PD	2.68±1.94	2.44±1.67	4.608	0.012
Borderline PD	5.21±1.72	5.00±1.77	0.324	0.724
Histrionic PD	3.78±1.66	4.17±1.72	1.999	0.140
Narcissistic PD	3.71±2.12	3.66±2.22	0.509	0.602
Avoidant PD	4.16±2.22	4.39±1.91	0.360	0.699
Dependent PD	4.00±2.32	4.83±2.23	1.834	0.164
Obsessive-compulsive PD	3.83±1.56	4.12±1.62	1.396	0.252
Depressive PD	4.04±1.74	4.78±1.81	2.510	0.086
Negativistic PD	3.94±1.91	4.05±1.70	0.490	0.614

Values are presented as mean±SD. PDQ-4+: Personality Disorder Questionnaire 4+, PD: personality disorder, SD: standard deviation, NSA: non-suicide attempters, SA: suicide attempters

Table 6. Mean, SD, F scores of DSQ for both groups of 125 participants

Variable	NSA (N=83)	SA (N=42)	F	p-value
Cluster score				
Maladaptive action	4.82±1.29	5.25±1.03	5.336	0.006
Image-distorting	4.25±1.24	4.56±1.29	1.465	0.235
Self-sacrificing	3.50±1.28	4.15±1.52	3.514	0.033
Adaptive	4.11±1.32	4.31±1.39	3.172	0.045
Defense mechanisms				
Neurotic denial	3.57±1.85	3.98±2.28	2.031	0.136
Non-delusional projection	4.37±1.62	3.96±1.53	2.600	0.078
Passive aggression	7.50±2.23	7.17±2.36	3.076	0.050
Acting out	7.14±1.64	7.29±1.41	0.434	0.649
Splitting of other's image	3.61±2.76	5.05±3.09	3.981	0.021
Projective identification	3.96±2.50	4.76±2.70	5.539	0.005
Omnipotence	4.97±2.51	5.16±2.33	1.661	0.194
Undoing	3.33±2.35	4.17±2.61	1.633	0.200
Affiliation	4.74±3.69	6.02±3.52	6.225	0.003
Somatization	3.65±2.87	3.78±2.98	0.290	0.749
Hypochondriasis	2.53±1.12	2.36±1.51	0.374	0.689

Values are presented as mean±SD. DSQ: Defense Style Questionnaire, SD: standard deviation, NSA: non-suicide attempters, SA: suicide attempters

cide attempters group in terms of relevant life events. This was inconsistent with previous studies that suggest a higher tendency to attempt suicide behaviors when experiencing stressful life events.[5,47] However, other studies have also shown that stressful situations and suicide attempts are not always correlated.[48,49] Therefore, this result is consistent with previous findings that state an individual's coping style with stressful life events affects their tendency to attempt suicide.[50,51] In other words, the inner world of the patient affected by stress is supposed more important to suicide attempt than the external stress itself.

The results of SCL-90-R revealed that patients in the suicide attempt group scored significantly higher on the hostility and paranoid ideation subscales. This result is consistent with previous findings that suggest hostility is associated with suicide regardless of depression,[52] and suicide attempters were more hostile than non-suicide attempters among patients with BPD.[53] Hostility is associated with the impulsive-aggressive dimension and encompasses emotional components such as anger or re-

Table 7. Binomial logistic regression analysis of clinical characteristics and psychological tests for suicide attempters of 125 participants

	B	SE	Wals	df	p-value	Exp (B)
Gender	1.335	0.486	7.531	1.000	0.006	3.799
MMPI-2						
F(B)	0.064	0.019	10.956	1.000	<0.001	1.067
L	0.098	0.035	7.607	1.000	0.008	1.098
DSQ						
Splitting of other's image	0.148	0.073	4.055	1.000	0.043	1.160
Constant	-10.377	2.459	17.810	1.000	<0.001	<0.000

Cox and Snell's R^2=0.222, Nagelkerke R^2=0.308. MMPI: Minnesota Multiphasic Personality, F(B): back infrequency, L: lie, DSQ: Defense Style Question

sentment.[53] Therefore, the results of this study suggest that suicide attempts in patients with BPD are associated with anger caused by internal hostility and frustration.

The profiles of MMPI-2 showed that patients in the suicide attempters group scored significantly higher than the non-suicide attempters group on F, F(B), and L validity scales. The comparatively higher scores on F and F(B) scales in the suicide attempter group suggest that the suicide attempters group experienced greater discomfort than the non-suicide attempters group. The difference in the scores on the L scale indicates a higher tendency of the suicide attempters groups to deny their symptoms as compared to the non-suicide attempters group. It could be assumed that suicide attempters experience severe discomfort due to their symptoms; however, the internal conflict caused by denial of these symptoms also affects an individual's tendency to attempt suicide. The suicide attempters group scored significantly higher on the Pa, Pt, and Sc clinical scales and significantly lower on the Mf clinical scale than the non-suicide attempters group. It can be inferred that suicide attempters are more paranoid, suspicious, hostile, and tend to get angry easily even with minor triggers in relation to themselves. In addition, the presence of an obsessive trait is likely to cause severe anxiety, and a high Sc score may indicate a feeling of alienation from the surroundings and a tendency to avoid social environment. These results were consistent with previous studies depicting an association between high scores on Pd, Pa, and Sc scales and suicidal behavior.[54] However, it is necessary to pay attention to the interpretation of the results because the results of the MMPI may not always be identically repeated and reflect a various individual inner worlds.[55]

The analysis of the scores on the PDQ-4+ revealed significantly higher scores on paranoid personality disorder scale in the suicide attempters group. This suggests that suicide attempters tend to be more paranoid and suspicious in interpersonal relations than non-suicide attempters. However, the suicide attempters group scored significantly lower on the antisocial personality disorder scale than the non-suicide attempters group. This result undermines evidence that suggests that the risk of attempting suicide increases with presence of antisocial personality trait in patients with BPD.[18] Antisocial personality disorder can be accompanied by impulsivity and anger like in BPD, however, the impulsivity and anger in antisocial personality disorder is more likely to be controlled in order to benefit oneself or control others.[56] Therefore, the characteristics of antisocial personality disorder may be assumed to play a role in reducing the tendency to attempt suicide. Additional studies may be required to confirm this assumption.

The analysis of the scores on the DSQ revealed significantly higher scores for the suicide attempters group than the non-suicide attempters group on maladaptive and self-sacrificing defense styles. Previous studies have depicted a positive correlation between maladaptive and image-distorting defense styles with the degree of personality disorder (Johnson, Bornstein, and Krukonis 1992). Furthermore, maladaptive action is an immature defense style that is associated with most personality disorders, whereas self-sacrificing defense style is associated with neurotic symptoms.[43]

The results of this study suggest that patients with severe BPD who are more likely to use maladaptive defense style are more likely to attempt suicide. This also confirms previous findings that suggest that the number of suicide attempts made by patients with major depressive disorder in their life span is associated with the use of both immature and neurotic defense styles.[57] The analysis indicated no difference in the use of image-distorting between the two groups, because the image-distorting defense style is a common defense mechanism in patients with personality disorders, and both groups comprise of patients with BPD. In detail, the suicide attempters group showed a significantly higher tendency to use splitting, projective identification, and affiliation defense mechanisms than the non-suicide attempters group. It can be inferred that the experience of being frustrated due to negative impact on interpersonal relationship when patients with BPD using affiliation simultaneously uses projective identification and splitting (immature and primitive defense mechanisms) may cause a greater emotional response to the patients. This also supports previous findings that the

person who has tried more suicide attempts tends to use more detailed defense mechanisms such as projections and splitting.[23]

On the other hand, although the level of significance was not high, there was a difference in the adaptive defense style between the suicide attempters group and non-suicide attempters group. There were some previous studies that the suicide attempters group had higher in mature defense style than non-suicide attempters group.[23,57] It is estimated that a group high on adaptive defense style and maladaptive and self-sacrificing defense styles together, experiences more discomfort. Similarly, people who use affiliation and primal defense mechanisms such as splitting, projective identification and etc. together, experience more discomfort in reality. In addition, splitting, the most basic defense mechanism of borderline personality disorder, may be related to the tendency of patients to wax and wane between pathological and normal conditions. Therefore, it might be necessary to explore the ratio of healthy defense mechanisms to psychopathological immature defense mechanisms rather than focusing on one dominant defense style.

In this study, these factors predicted non-suicide attempters group more accurately than the suicide attempters group. Considering that the number of non-suicide attempters was twice as large as that of suicide attempters, the psychological characteristics of non-suicide attempters group may have been biased. In conclusion, female, severe discomfort due to symptoms and denial of symptoms at the same time, increased use of immature defense mechanisms such as splitting may constitute the risk factors for suicide attempts in patients with BPD. Further evaluation of the above findings might be necessary to confirm these conclusions.

This study has several limitations. Firstly, since this study focused only on patients at one university hospital, it may be difficult to assess the extent to which these findings can be generalized. Secondly, all psychological characteristics were measured using self-report tools. Finally, as a retrospective study, it is not possible to determine whether the differences between the suicide attempters group and non-suicide attempters group are the cause or the result of suicide attempts. Future research must focus on prospective studies to confirm the causal relationship. Despite these limitations, this study examined the psychodynamic aspects, clinical features, psychological characteristics, and defense mechanisms in a relatively larger sample of patients than samples previously studied. Therefore, this study may aid in understanding the psychological characteristics of suicide attempters among patients with BPD, and in estimating the risk factors for suicide attempt in patients with BPD.

Acknowledgments

The abstract of this study was presented at the poster section of 51st International Psychoanalytical Association (IPA) Congress London-2019.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Bon-Hoon Koo. Data curation: Young-Ji Lee, Mu-Sung Keum, Hye-Geum Kim, Eun-Jin Cheon, Bon-Hoon Koo. Formal analysis: Young-Chul Cho. Funding acquisition: Bon-Hoon Koo. Investigation: Mu-Sung Keum. Methodology: Bon-Hoon Koo. Project administration: Bon-Hoon Koo. Resources: Bon-Hoon Koo. Software: Young-Chul Cho. Supervision: Bon-Hoon Koo. Validation: Young-Chul Cho, Bon-Hoon Koo. Visualization: Young-Chul Cho. Writing—original draft: Mu-Sung Keum, Young-Ji Lee. Writing—review & editing: Young-Ji Lee, Hye-Geum Kim, Eun-Jin Cheon, Bon-Hoon Koo.

ORCID iDs

Young-Ji Lee	https://orcid.org/0000-0003-0201-2518
Mu-Sung Keum	https://orcid.org/0000-0002-0855-8637
Hye-Geum Kim	https://orcid.org/0000-0002-9677-7011
Eun-Jin Cheon	https://orcid.org/0000-0002-6986-0768
Young-Chul Cho	https://orcid.org/0000-0001-6848-8530
Bon-Hoon Koo	https://orcid.org/0000-0001-9633-3835

REFERENCES

1. Bertolote JM, Fleischmann A. A global perspective in the epidemiology of suicide. Suicidologi 2015;7:6-8.
2. World Health Organization. Preventing Suicide: A Global Imperative. Geneva: World Health Organization; 2014.
3. Shin HY, Lee JY, Kim JE, Lee S, Youn H, Kim H, et al. Cause-of-death statistics in 2016 in the Republic of Korea. J Korean Med Assoc 2018; 61:573-584.
4. Organization for Economic Cooperation and Development (OECD). Health at a Glance 2017: OECD Indicators. Paris: OECD Publishing; 2017.
5. Brent DA, Perper JA, Moritz G, Allman C, Friend A, Roth C, et al. Psychiatric risk factors for adolescent suicide: a case-control study. J Am Acad Child Adolesc Psychiatry 1993;32:521-529.
6. Teti GL, Rebok F, Rojas SM, Grendas L, Daray FM. Systematic review of risk factors for suicide and suicide attempt among psychiatric patients in Latin America and Caribbean. Rev Panam Salud Publica 2014;36: 124-133.
7. Andlin-Sobocki P, J?nsson B, Wittchen HU, Olesen J. Cost of disorders of the brain in Europe. Eur J Neurol 2005;12:1-27.
8. Wittchen HU, Jacobi F, Rehm J, Gustavsson A, Svensson M, Jonsson B, et al. The size and burden of mental disorders and other disorders of the brain in Europe 2010. Eur Neuropsychopharmacol 2011;21:655-679.
9. Tondo L, Isacsson G, Baldessarini R. Suicidal behaviour in bipolar disorder: risk and prevention. CNS Drugs 2003;17:491-511.
10. Undurraga J, Baldessarini RJ, Valenti M, Pacchiarotti I, Vieta E. Suicidal risk factors in bipolar I and II disorder patients. J Clin Psychiatry 2012; 73:778-782.
11. Ando S, Kasai K, Matamura M, Hasegawa Y, Hirakawa H, Asukai N. Psychosocial factors associated with suicidal ideation in clinical patients with depression. J Affect Disord 2013;151:561-565.
12. Underwood B, Froming WJ, Moore BS. Mood and personality: a search for the causal relationship 1. J Pers 1980;48:15-23.
13. Dubovsky AN, Kiefer MM. Borderline personality disorder in the primary care setting. Med Clin North Am 2014;98:1049-1064.
14. Mun BY, Jeong JY, Lee HR, Song SH, Lee JY, Koo BH. Gender difference in clinical and psychological characteristics in patients with borderline personality disorder at a university hospital. Psychoanalysis 2011;22:9-18.
15. Zanarini MC, Frankenburg FR, Khera GS, Bleichmar J. Treatment histories of borderline inpatients. Compr Psychiatry 2001;42:144-150.

16. Zanarini MC, Frankenburg FR, Hennen J, Reich DB, Silk KR. The McLean Study of Adult Development (MSAD): overview and implications of the first six years of prospective follow-up. J Pers Disord 2005; 19:505-523.
17. American psychiatric association practice guidelines. Practice guideline for the treatment of patients with borderline personality disorder. American Psychiatric Association. Am J Psychiatry 2001;158(10 Suppl): 1-52.
18. Soloff PH, Lis JA, Kelly T, Cornelius J, Ulrich R. Risk factors for suicidal behavior in borderline personality disorder. Am J Psychiatry 1994; 151:1316-1323.
19. van Asselt AD, Dirksen CD, Arntz A, Severens JL. The cost of borderline personality disorder: societal cost of illness in BPD-patients. Eur Psychiatry 2007;22:354-361.
20. Franco-Martin MA, Munoz-Sanchez JL, Sainz-de-Abajo B, Castillo-Sanchez G, Hamrioui S, de la Torre-Diez I. A systematic literature review of technologies for suicidal behavior prevention. J Med Syst 2018; 42:71.
21. Hegerl U. Prevention of suicidal behavior. Dialogues Clin Neurosci 2016; 18:183-190.
22. Wolfersdorf M, Schneider B, Schmidtke A. [Suicidal behavior: a psychiatric emergency situation, suicide prevention: a psychiatric obligation]. Nervenarzt 2015;86:1120-1129.
23. Corruble E, Hatem N, Damy C, Falissard B, Guelfi JD, Reynaud M, et al. Defense styles, impulsivity and suicide attempts in major depression. Psychopathology 2003;36:279-284.
24. Lee SA, Kim KH, Suh SY. Comparison of emotional and psychological characteristics between suicide attempters and non-attempters in depressed patients: using MMPI-2 profiles. Korean J Psychosom Med 2012;20:40-49.
25. Lee K, Lee HK, Kim SH, Jang EY, Kim D. Suicide risk and the MMPI-2 findings among college students. Anxiety Mood 2015;11:120-128.
26. Krause-Utz A, Winter D, Niedtfeld I, Schmahl C. The latest neuroimaging findings in borderline personality disorder. Curr Psychiatry Rep 2014;16:438.
27. Paris J. Effectiveness of different psychotherapy approaches in the treatment of borderline personality disorder. Curr Psychiatry Rep 2010;12: 56-60.
28. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. 5th Ed. Arlington: American Psychiatric Publishing; 2013.
29. American Psychiatric Association. Diagnostic Criteria from DSM-IV-TR. Washington: American psychiatric Association; 2000.
30. Derogatis LR, Lipman RS, Covi L. SCL-90: an outpatient psychiatric rating scale--preliminary report. Psychopharmacol Bull 1973; 9: 13-28.
31. De Las Cuevas C, Arredondo MT, Cabrera MF, Sulzenbacher H, Meise U. Randomized clinical trial of telepsychiatry through videoconference versus face-to-face conventional psychiatric treatment. Telemed J E Health 2006;12:341-350.
32. Koo BH, Jung EJ, Seo WS, Song CJ, Chang HK, Bai DS. The comparison of MMPI and neuropsychological tests according to degree of subjective symptom complaints in patients with traumatic head injury. J Korean Neuropsychiatr Assoc 2005;44:743-753.
33. Gundel H, Wolf A, Xidara V, Busch R, Ceballos-Baumann AO. Social phobia in spasmodic torticollis. J Neurol Neurosurg Psychiatry 2001; 71:499-504.
34. Schmitz N, Hartkamp N, Franke GH. Assessing clinically significant change: application to the SCL-90-R. Psychol Rep 2000;86:263-274.
35. Derogatis LR. SCL-90-R: Administration, Scoring and Procedures Manual-II for the (Revised) Version and Other Instruments of the Psychopathology Rating Scale Series. 2nd Ed. Towson: Clinical Psychometric Research; 1992.
36. Choi H, Lee HJ, Lee HY. The effects of torture-related stressors on long-term complex post-traumatic symptoms in South Korean torture survivors. Int J Psychol 2017;52(Suppl 1):57-66.
37. Kim KI, Kim JH, Won HT. Korean Version of Symptom Checklist-90-Revised (SCL-90-R) Professional Manual. Seoul: ChoongAng Aptitude Publishing; 1984.
38. Butcher J, Dahlstrom W, Graham J, Tellegen A, Kaemmer B. Manual for the Administration and Scoring of the MMPI-2. Minneapolis: University of Minnesota Press; 1989.
39. Camara WJ, Nathan JS, Puente AE. Psychological test usage: Implications in professional psychology. Prof Psychol Res Pract 2000;31:141-154.
40. Han K, Lim J, Min B, Lee J, Moon K, Kim Z. Korean MMPI-2 standardization study. Korean J Clin Psychol 2006;25:533-564.
41. Hyler SE. Personality Diagnostic Questionnaire-4. New York: New York State Psychiatric Institute; 1994.
42. Kim DI, Choi MR, Cho EC. The preliminary study of reliability and validity on the Korean version of personality disorder questionnaire-4+ (PDQ-4+). J Korean Neuropsychiatr Assoc 2000;39:525-538.
43. Bond MP, Vaillant JS. An empirical study of the relationship between diagnosis and defense style. Arch Gen Psychiatry 1986;43:285-288.
44. Chung MW, Park SH, Kim SH. A preliminary study for the development of a defense style questionnaire adapted for Koreans. J Korean Neuropsychiatr Assoc 1993;32:707-716.
45. Bozzay ML, Liu RT, Kleiman EM. Gender and age differences in suicide mortality in the context of violent death: findings from a multistate population-based surveillance system. Compr Psychiatry 2014; 55:1077-1084.
46. Jeon HJ, Lee JY, Lee YM, Hong JP, Won SH, Cho SJ, et al. Lifetime prevalence and correlates of suicidal ideation, plan, and single and multiple attempts in a Korean nationwide study. J Nerv Ment Dis 2010; 198:643-646.
47. Gould MS, Fisher P, Parides M, Flory M, Shaffer D. Psychosocial risk factors of child and adolescent completed suicide. Arch Gen Psychiatry 1996;53:1155-1162.
48. Liu RT, Miller I. Life events and suicidal ideation and behavior: a systematic review. Clin Psychol Rev 2014;34:181-192.
49. McKeown RE, Garrison CZ, Cuffe SP, Waller JL, Jackson KL, Addy CL. Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. J Am Acad Child Adolesc Psychiatry 1998;37:612-619.
50. Kumar PN, George B. Life events, social support, coping strategies, and quality of life in attempted suicide: a case-control study. Indian J Psychiatry 2013;55:46-51.
51. Johnson J, Wood AM, Gooding P, Taylor PJ, Tarrier N. Resilience to suicidality: the buffering hypothesis. Clin Psychol Rev 2011;31:563-591.
52. Lemogne C, Fossati P, Limosin F, Nabi H, Encrenaz G, Bonenfant S, et al. Cognitive hostility and suicide. Acta Psychiatr Scand 2011;124:62-69.
53. Ferraz L, Portella MJ, Vallez M, Gutierrez F, Martin-Blanco A, Martin-Santos R, et al. Hostility and childhood sexual abuse as predictors of suicidal behaviour in Borderline Personality Disorder. Psychiatry Res 2013;210:980-985.
54. Clopton JR, Post RD, Larde J. Identification of suicide attempters by means of MMPI profiles. J Clin Psychol 1983;39:868-871.
55. Daigle M. MMPI inmate profiles: suicide completers, suicide attempters, and non-suicidal controls. Behav Sci Law 2004;22:833-842.
56. de Barros DM, de Padua Serafim A. Association between personality disorder and violent behavior pattern. Forensic Sci Int 2008;179:19-22.
57. Corruble E, Bronnec M, Falissard B, Hardy P. Defense styles in depressed suicide attempters. Psychiatry Clin Neurosci 2004;58:285-288.