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Predictors of Suicide Threats in Patients with Borderline Personality Disorder Over 16 Years of Prospective Follow-up

Michelle M. Wedig^{a,b}, Frances R. Frankenburg^{a,c}, D. Bradford Reich^{a,b}, Garrett Fitzmaurice^{b,d}, and Mary C. Zanarini^{a,b}

^aLaboratory for the Study of Adult Development, McLean Hospital, Belmont, MA, USA

^bDepartment of Psychiatry, Harvard Medical School, Boston, MA, USA

^cDepartment of Psychiatry, Boston University School of Medicine, Boston, MA, USA

^dLaboratory for Psychiatric Biostatistics, McLean Hospital, Belmont, MA, USA

Abstract

Despite their impact on interpersonal relationships and health resources, suicide threats are not often studied in those with borderline personality disorder (BPD). The primary aim of this study was to examine **clinically relevant** predictors of suicide threats in this patient group. Two-hundred and ninety inpatients meeting Revised Diagnostic Interview for Borderlines (DIB-R) and DSM-III-R criteria for BPD were assessed during their index admission using a series of semistructured interviews and a self-report measure. These subjects were then reassessed using the same instruments every two years for 16 years. All variables in the bivariate analyses were found to be significant. In multivariate analyses, five predictors were found to be significant: feeling abandoned, hopeless, and hurt, and being demanding and manipulative. The results of this study suggest that suicide threats are often related to emotions connected with interpersonal relationships. Suicide threats may function, albeit maladaptively, to regulate these emotions aroused by interpersonal relationships and bring needed support.

Keywords

Suicide threats; predictors; borderline personality disorder; interpersonal relationships

1. Introduction

Recurrent suicide threats, gestures, and attempts are one of the DSM-IV diagnostic criteria for borderline personality disorder (BPD). Although most research to date has grouped these behaviors together, they may be distinct. Those making suicide threats may or may not actually plan to attempt suicide. A suicide threat is a verbal statement or behavioral act that may indicate serious intent to kill oneself. Examples of suicide threats might include, "If I don't feel better by tomorrow, I'll kill myself;" "If my wife leaves me, I'm going to shoot myself;" "Maybe I'll come next week, maybe I won't." In contrast, suicide attempts involve actual efforts to try to kill oneself.

Some research has been conducted concerning the predictors of suicide attempts (i.e., Brodsky et al., 2006; Brodsky et al., 1997; Chesin et al., 2010; Fyer et al., 1988; Soloff & Fabio, 2008; Soloff et al., 2000; van den Bosch et al., 2001; Wedig et al., 2012; Wilson et

al., 2006; Yen et al., 2004; Yen et al., 2009; Yen et al., 2011). But to date, no studies have examined suicide threats as distinct from suicide attempts. This is particularly unfortunate as suicide threats are challenging for clinicians to handle as it is difficult to determine the actual suicidal intent of those making them.

The current study is the first to examine the predictors of suicide threats utilizing data from the McLean Study of Adult Development (MSAD), which has a well-characterized and carefully diagnosed longitudinal sample with BPD and axis II comparison subjects. From this rich data set, we selected fourteen internal states and five interpersonal predictors based on expert consensus and clinical experience. We tested these variables in both bivariate and multivariate models to examine how these time-varying predictors function over time.

2. Method

2.1 Procedures

The methodology of this study, which was reviewed and approved by the McLean Hospital Institutional Review Board, has been described in detail elsewhere (Zanarini et al., 2003). Briefly, all subjects were initially inpatients at McLean Hospital in Belmont, Massachusetts. Each patient was first screened to determine that he or she: 1) was between the ages of 18–35; 2) had a known or estimated IQ of 71 or higher; 3) had no history or current symptoms of schizophrenia, schizoaffective disorder, bipolar I disorder, or an organic condition that could cause psychiatric symptoms; and 4) was fluent in English.

After the study procedures were explained, written informed consent was obtained. Each patient then met with a masters-level interviewer blind to the patient's clinical diagnoses for a thorough diagnostic assessment. Three semistructured diagnostic interviews were administered. These diagnostic interviews were: 1) the Structured Clinical Interview for DSM-III-R Axis I Disorders (SCID-I, Spitzer et al., 1992) to assess for the presence of axis I psychiatric disorders, 2) the Revised Diagnostic Interview for Borderlines (DIB-R, Zanarini et al., 1989) to assess the presence and severity of symptoms of BPD, and 3) the Diagnostic Interview for DSM-III-R Personality Disorders (DIPD-R, Zanarini et al., 1987) to assess for the presence and severity of BPD and other axis II disorders. The inter-rater and test-retest reliability of all three of these measures have been found to be good-excellent (Zanarini & Frankenburg, 2001; Zanarini et al., 2002).

At each of eight follow-up waves, separated by 24 months, axis I and II psychopathology was reassessed via interview methods similar to the baseline procedures by staff members blind to baseline diagnoses. After informed consent was obtained, our diagnostic battery was readministered (with the SCID I focusing on the past two years and not lifetime axis I psychopathology as at baseline). The follow-up interrater reliability (within one generation of follow-up raters) and follow-up longitudinal reliability (from one generation of raters to the next) of these three measures have been found to be good-excellent (Zanarini & Frankenburg, 2001; Zanarini et al., 2002).

In addition, the Dysphoric Affect Scale (DAS, Zanarini & DeLuca, 1993) was used to measure the percentage of time participants reported a series of dysphoric internal states. The DAS is a self-report measure containing 50 items selected specifically by our group almost 20 years ago to assess dysphoric affective and cognitive states thought to be characteristic of and discriminating for BPD. With the DAS, subjects are asked to report the percentage of time that he or she has experienced each affective state or cognition during the past month. The psychometric properties of the DAS are excellent, with very high internal consistency (Cronbach's $\alpha = 0.97$). In addition, the 1-week-test-retest reliability of the DAS

was found to be 0.97 when examined in a sample of 15 nonpsychotic outpatients (Reed et al., 2012; Reed et al., in press; Zanarini et al., 1998).

For this study, the 50 items from the DAS were given to five experts in the field of BPD and a consensus of 14 items chosen that at least three individuals agreed would be hypothesized to predict suicide threats. These experts were doctoral level investigators who had a wide range of experience in the field of BPD (mean = 21 years, range 6–30 years). Furthermore, because the DAS was first administered approximately halfway through the baseline wave, 150 borderline patients did not have data for this measure at this time point. A multiple imputation procedure, by a series of chained equations (as implemented in Stata Version 11.2, StataCorp, 2009), was used to conduct analyses including data from baseline. The imputation procedure utilized 10 imputations and incorporated 2- through 16-year follow-up DAS data as predictors of the missing baseline data. To assess the sensitivity of the results to this imputation procedure, all analyses were re-run without imputed baseline data and results were similar. Finally, because the data were positively skewed, all 14 inner state items chosen were log transformed prior to analyses.

Our binary outcome was the presence/absence of a suicide threat in the two-year prior to each subject's index admission and during each of the study's eight two-year follow-up periods as assessed by the DIB-R.

2.2 Participants

Only those participants with a baseline diagnosis of BPD were included in this study. Two hundred and ninety patients met both DIB-R and DSM-III-R criteria for BPD. In terms of baseline demographic data, 80.3% (N=233) of the subjects were female and 87.2% (N=253) were white. The average age of the borderline subjects was 26.9 years (SD=5.8), their mean socioeconomic status was 3.4 (SD=1.5) (where 1=highest and 5=lowest, Hollingshead, 1957), and their mean Global Assessment of Functioning (GAF) score was 38.9 (SD=7.5) (indicating major impairment in several areas, such as work or school, family relations, judgment, thinking, or mood).

In terms of continuing participation, 87.5% (N=231/264) of surviving borderline patients (13 committed suicide and 13 died of other causes) were reinterviewed at all eight follow-up waves.

2.3 Statistical Analyses

Descriptive statistics were used to report the frequencies, means, and SD of the predictor and outcome variables. Categorical variables are reported as % (*n*) and continuous data are presented as means (SD, range). Statistical significance was determined by two-tailed $p < 0.05$.

The generalized estimating equations (GEE) approach was used in longitudinal analyses of the predictors of the presence of suicide threats using Stata 11.2 (StataCorp, 2009). These analyses modeled the log odds (or logit of the prevalence) of suicide threats at each occasion, yielding an odds ratio (OR) and 95% confidence interval (95% CI) for the association with a given predictor. Analyses also appropriately accounted for the correlation among the repeated measures of suicide threats. In all analyses, we controlled for assessment period via the inclusion of a quadric time trend to allow for the discernible non-linear decline in prevalence of suicide threats over time. We first assessed the relationship between each predictor variable and the presence of a suicide threat in a bivariate fashion, while controlling for assessment period. Next, to select the subset of predictors to be retained in the most parsimonious multivariate model, we entered all the significant variables from the

bivariate analyses simultaneously and followed a backward deletion procedure, singularly deleting one variable at a time based on which variable was least significant until all variables remaining were statistically significant at $p < 0.05$. In this analysis, assessment period was always included as a covariate to allow for temporal variation in the prevalence of suicide threats.

We examined multicollinearity in the items we included as we were concerned about intercorrelations. We determined that the average variance inflation factor (VIF) for years 2–16 for the DAS predictors was 2.72 (baseline was not included in this analysis because, as noted above, half the data was imputed). The minimum VIF was 1.56 while the maximum was 4.87. Similarly, the average VIF for the items included in the final model was 1.41 with the minimum being 1.15 and the maximum being 1.66.

We also examined the relationship between suicide threats and suicide attempts within each time period using the GEE approach.

Finally, due to the difference in time frame between the way the questions were asked in the DAS (last month) and the DIB-R (last two years), we also ran the analyses using lagged indicators, using responses on the DAS to predict the presence of threats in the following two years.

3. Results

The following prevalence rates for suicide threats were found at the study's nine measurement periods: 57.6% ($N=167$) at baseline, 38.5% ($N=106$) at two-year follow-up, 26.0% ($N=70$) at four-year follow-up, 17.4% ($N=46$) at six-year follow-up, 16.1% ($N=41$) at eight-year follow-up, 12.9% ($N=32$) at ten-year follow-up, 12.7% ($N=31$) at 12-year follow-up, 10.5% ($N=25$) at 14-year follow-up, and 10.8% ($N=25$) at 16-year follow-up.

We selected 14 inner state predictors from the DAS and five interpersonal predictors from the DIB-R based on expert consensus and clinical experience. Table 1 displays the descriptive statistics for the inner states of the DAS. Generally, the mean percentage of time participants reported experiencing each inner state declined over time.

Table 2 depicts the descriptive statistics for the interpersonal behaviors hypothesized to predict suicide threats. Again, the percentage of participants endorsing these behaviors declined over time.

Table 3 depicts the bivariate results for all predictors. All variables significantly predicted suicide threats across time at the $p < .05$ level. Generally, inner state variables had a range of six and a half to 50-fold increase in the odds of making a suicide threat for every ten-point increase in items from the DAS. The interpersonal behaviors of devaluation, entitlement, and sadism had approximately a 1.7-fold increase in the odds of making a suicide threat, while manipulation and demandingness had slightly larger odds with an over 2-fold increase in the odds of making a suicide threat.

Table 4 depicts the final multivariate model, after the backward deletion procedure. In this model, feeling abandoned and hopeless, and manipulativeness and demandingness were found to be significant predictors at the $p < .05$ level. The inner states had between a 3- and 20-fold increase in the odds of making a suicide threat for every ten-point increase, while the interpersonal behaviors had an approximately 1.8-fold increase in the odds of making a suicide threat.

We also examined the likelihood of making a suicide attempt within the same time period of making a suicide threat. We found a significant relationship between making a suicide threat and making an attempt ($OR=3.02$, $p<0.001$, 95% $CI=2.24-4.07$).

Finally, the lagged indicator analysis revealed similar results to the initial analysis. The differences include that sadism was not significant in the bivariate analysis and demandingness and feeling hopeless fell out of the multivariate analysis.

4. Discussion

Results from this study show that, when examined independently, all the hypothesized inner states and interpersonal behaviors selected predict the presence of a suicide threat over time. When examined in a multivariate manner, two inner states (feeling abandoned and hopeless) and two interpersonal behaviors (being manipulative and demandingness) remained significant predictors of suicide threats.

The inner states that remained significant in the multivariate model can both be seen as being related to interpersonal relationships and given that suicide threats entail an interpersonal component, these findings make clinical sense. For example, if someone feels abandoned by another he or she might reach out and try to get the other person back via any method he or she can. Hopelessness might be seen as interpersonal, in that individuals might be hopeless that things will ever get better in an interpersonal relationship, but it should also be noted that hopelessness can also be about other things, such as inner pain ever getting better or vocational failure. In any case, the person might feel abandoned, hopeless, hurt, and some BPD patients will not be able to tolerate these feelings and have to take some kind of action. In some cases, this may be turning to self-injury, while in other cases, where interpersonal relationships are involved, the person may need to get the attention or involvement of another person, which might take the form of a suicide threat.

The interpersonal behaviors that remained significant after the backward deletion procedure also make sense in an interpersonal context. One of the core symptoms of BPD is affect dysregulation. Researchers have suggested that those with BPD are emotionally reactive with intense sensitivity to emotion and severe intensity of emotion. They also often take a long time to return to baseline after experiencing an emotion (Linehan, 1993; Nock et al., 2008). Furthermore, they often have not learned how to manage these emotions (Linehan, 1993). Thus, some of those with BPD are not able to tolerate or regulate the feelings of aloneness or chronic emotional pain. As a result of this, those close to patients often pull away from their intense affect and patients may, in turn, do anything they can to pull significant others closer. This may include doing things that seem demanding and manipulative, when these can rather be seen as outmoded methods of survival (Zanarini & Frankenburg, 1994).

Thus, it makes sense that those with BPD who feel abandoned by others and hopeless that things will get better might make suicide threats to regulate their distress and try to bring significant others closer in whatever way they can. Furthermore, being manipulative and demanding can also be related to the making of suicide threats. However all of these things, and suicide threats themselves, might be viewed as desperate attempts to pull others closer to feel less abandoned and hopeless.

It is also important to discuss the predictors that did not remain significant in the multivariate analysis. First, no items having to do with anger (i.e., “very angry inside,” “furious or enraged inside”) remained in the model. This suggests that those with BPD who make suicide threats do not do it impulsively out of anger. Similarly, cognitive states did not

remain in the model, including items such as “like the pain will never end,” “desperate,” “overwhelmed” and “completely out of control.” This suggests that suicide threats are not about intense inner states more generally, and may be more related to affective states relating to interpersonal relationships. Finally, items having to do with others disliking them or being malevolent also failed to remain in the model (i.e., “like no one cares about me,” “like people hate me,”). This is somewhat surprising as these items may be related to interpersonal relationships and the emotions surrounding them. It may be the case that these internal states are so powerful that suicide threats do not work to pull people closer and regulate affect, so other methods must be used, such as self-injury and suicide attempts. However, future research must be conducted to confirm this hypothesis.

It is important to point out that suicide threats predicted suicide attempts in the same time period, suggesting that suicide threats are highly dangerous behaviors. However, given the way our data were collected we cannot be sure these two things were directly related and a suicide attempt may have even preceded the suicide threat. However, our lagged analyses suggest that threats do proceed attempts. This does not take away from the dangerousness of both behaviors.

There are a number of limitations to this study. First, all participants were initially inpatients at baseline and were thus seriously ill at the start of the study. Therefore we cannot know whether these results might generalize to a less severe population. Second, the majority of the participants were in treatment during each study period (Hörz et al., 2010), so future research might attempt to replicate these results in a non-treatment seeking sample. Third, all data were collected via patient self-report; future research might employ different methods (i.e., ecological momentary assessment). Fourth, some of the predictors in the bivariate analyses had relatively large confidence intervals. Thus these results must be interpreted with caution. Finally, another limitation was that half of our baseline data for the DAS was imputed.

In conclusion, our findings suggest that suicide threats are related to dysphoric emotional states and maladaptive behavior patterns that are interpersonal in nature.

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Table 1

Mean percentage of time inner states experienced in the sample. Data presented as mean percentage (SD).

Variable	Baseline	2YR FU	4YR FU	6YR FU	8YR FU	10YR FU	12YR FU	14YR FU	16YR FU
<i>Affective States</i>									
Abandoned	45.2 (33.5)	30.1 (33.6)	25.1 (31.6)	23.2 (29.7)	17.6 (27.5)	16.4 (24.6)	17.7 (27.9)	16.2 (27.2)	17.3 (27.6)
All alone	58.2 (32.8)	38.5 (35.6)	36.6 (36.6)	30.8 (33.7)	25.6 (33.2)	22.9 (30.0)	24.9 (33.0)	22.8 (31.0)	25.1 (31.9)
Desperate	47.7 (33.0)	27.9 (32.5)	25.5 (31.2)	21.1 (27.3)	18.1 (26.5)	16.5 (25.6)	16.9 (25.5)	15.1 (25.9)	15.8 (25.7)
Furious or enraged Inside	39.1 (33.1)	26.8 (32.9)	23.1 (30.7)	18.8 (27.1)	17.1 (26.7)	13.6 (23.6)	14.9 (25.2)	12.2 (22.7)	14.4 (25.7)
Hopeless	54.7 (31.0)	36.3 (34.8)	35.3 (35.9)	29.0 (31.4)	24.2 (30.1)	23.3 (29.5)	24.3 (31.5)	21.5 (30.1)	21.2 (29.5)
Hurt	55.7 (30.2)	40.4 (31.5)	36.5 (32.6)	33.2 (31.2)	26.7 (27.6)	24.1 (26.3)	25.4 (27.9)	22.5 (28.1)	24.5 (29.1)
In agony	32.1 (31.2)	18.9 (28.7)	17.3 (29.0)	13.4 (24.6)	9.7 (20.4)	9.1 (20.1)	10.7 (21.6)	9.7 (21.3)	12.0 (23.1)
Overwhelmed	60.6 (29.8)	44.1 (33.4)	41.1 (33.3)	39.0 (31.1)	36.2 (31.5)	35.5 (31.6)	34.6 (30.6)	33.4 (31.2)	33.2 (30.7)
Very angry inside	52.6 (32.1)	38.4 (35.0)	34.8 (33.6)	29.8 (30.7)	26.8 (29.7)	23.1 (27.0)	24.3 (28.6)	21.9 (29.2)	23.0 (29.5)
<i>Cognitive States</i>									
Completely out of control	36.7 (30.8)	20.1 (27.9)	18.3 (26.9)	14.2 (23.2)	13.4 (23.2)	10.7 (21.9)	10.3 (21.0)	9.7 (19.7)	11.2 (21.8)
Like no one cares about me	41.0 (33.6)	23.0 (29.6)	23.2 (31.8)	20.1 (29.0)	17.2 (29.0)	14.0 (25.6)	16.4 (27.7)	17.6 (28.9)	16.9 (27.8)
Like people hate me	31.5 (31.8)	17.1 (26.1)	16.2 (28.1)	13.4 (24.5)	11.7 (23.6)	9.3 (21.1)	9.7 (21.3)	9.4 (20.8)	11.2 (23.5)
Like the pain will never end	64.0 (32.1)	42.9 (38.4)	39.2 (39.4)	33.6 (35.4)	27.6 (34.3)	25.4 (33.1)	28.8 (35.6)	25.4 (34.5)	24.8 (33.4)
Misunderstood	51.4 (31.3)	39.2 (30.6)	36.2 (32.7)	33.0 (30.4)	28.3 (28.6)	25.4 (28.0)	28.4 (30.8)	24.9 (30.8)	33.7 (30.7)

Table 2Prevalence of interpersonal states in the sample. Data presented percent prevalence (*n*).

Variable	Baseline	2YR FU	4YR FU	6YR FU	8YR FU	10YR FU	12YR FU	14YR FU	16YR FU
Devaluation	46.2 (134)	40.0 (110)	36.1 (97)	23.1 (61)	20.8 (53)	17.7 (44)	12.3 (30)	18.9 (45)	14.7 (34)
Manipulation	84.5 (245)	65.5 (180)	44.6 (120)	26.9 (71)	26.3 (67)	17.7 (44)	16.4 (40)	14.7 (35)	10.8 (25)
Sadism	32.4 (94)	24.4 (67)	21.2 (57)	11.0 (29)	4.7 (12)	4.0 (10)	4.5 (11)	2.9 (7)	3.9 (9)
Demandingness	57.9 (168)	38.6 (106)	31.6 (85)	17.4 (46)	7.8 (20)	9.2 (23)	9.8 (24)	9.2 (22)	8.7 (20)
Entitlement	39.3 (114)	29.5 (81)	22.7 (61)	16.3 (43)	11.0 (28)	9.2 (23)	6.2 (15)	10.1 (24)	8.7 (20)

Table 3

Bivariate predictors of suicide threats over 16 years of prospective follow-up.

Variable	Odds Ratio	z	p	95% Confidence Interval
<i>Inner states (units of 10)</i>				
Hopeless	50.64	8.99	<0.001	21.53 119.11
Like the pain will never end	23.25	7.40	<0.001	10.11 53.48
Misunderstood	19.15	5.83	<0.001	7.09 51.68
Hurt	9.28	4.56	<0.001	3.56 24.17
Overwhelmed	14.29	4.75	<0.001	4.77 42.85
Abandoned	11.50	6.26	<0.001	5.35 24.70
Desperate	10.39	6.29	<0.001	5.01 21.54
All alone	10.15	6.23	<0.001	4.90 21.04
Very angry inside	10.03	5.64	<0.001	4.50 22.34
In agony	8.59	6.60	<0.001	4.54 16.26
Like no one cares about me	8.23	6.61	<0.001	4.40 15.37
Furious or enraged inside	7.10	5.65	<0.001	3.60 14.03
Like people hate me	7.09	5.47	<0.001	3.51 14.30
Completely out of control	6.60	5.64	<0.001	3.42 12.69
<i>Interpersonal behaviors</i>				
Manipulation	2.48	6.89	<0.001	1.92 3.21
Demandingness	2.17	5.61	<0.001	1.66 2.85
Entitlement	1.84	4.25	<0.001	1.39 2.45
Sadism	1.72	3.54	<0.001	1.28 2.33
Devaluation	1.53	3.44	0.001	1.20 1.94

Table 4

Multivariate model of significant predictors of suicide threats over 16 years of prospective follow-up.

Variable	Odds Ratio	z	p	95% Confidence Interval
<i>Inner states</i>				
Hopeless	20.47	5.95	<0.001	7.57 55.35
Abandoned	3.01	2.49	0.01	1.27 7.14
<i>Interpersonal Behaviors</i>				
Demandingness	1.92	5.07	<0.001	1.49 2.47