Suicidal behavior and psychosocial outcome in Borderline Personality Disorder at 8-year follow-up.

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Abstract

Long term outcome for most patients with BPD includes diagnostic and symptomatic remission; however, a majority never achieve psychosocial recovery and 3% - 10% die by suicide. We sought predictors of both suicidal behavior and psychosocial outcome in subjects with BPD followed for 8 years, and asked if there was a relationship between these outcomes. 123 BPD subjects, recruited from inpatient (35.8%), outpatient (30.9%) and community (33.3%) sources, were assessed annually for known risk factors for suicidal behavior, including demographic, diagnostic, clinical and socio-economic variables. Proportional hazards models examined predictive associations between risk factors, time-to-suicide attempt, and poor psychosocial outcome at 8 year follow-up (defined as GAS < 61). Interval attempts were reported by 25 subjects (20.2%). Increased risk of suicide attempt was associated with measures reflecting illness severity (negative affectivity, aggression, inpatient recruitment, hospitalizations), and socio-economic status (minority race, frequent changes in employment). Decreased risk was associated with increased education. Poor psychosocial outcome was predicted by personality dimensions of impulsivity, negative affectivity, and anti-social traits at baseline, and by co-morbid MDD at 8 year follow-up. There was no significant relationship between poor psychosocial outcome at 8 year follow-up and risk of suicidal behavior. Socio-economic status was indirectly related to suicide risk through minority race. Predictors of suicidal behavior and poor psychosocial outcomes include modifiable risk factors: negative affectivity, impulsivity, aggression, and chronic depression. Rehabilitation models are needed to address educational and vocational deficits associated with suicidality, especially in minority patients.

Keywords

suicide; borderline personality disorder; psychosocial factors; socio-economic factors

Introduction

Personality disorder (PD) is an important risk factor for suicide, increasing the likelihood of suicide seven- fold among men and six- fold among women, independent of co-morbid Axis I disorders (Schneider et al., 2006). Among PD patients, the majority of suicidal behaviors are attributable to those with Borderline Personality Disorder (BPD) (Isomesta et al., 1996; Schneider et al., 2006; Yen et al., 2003). Co-morbidity with BPD increases the risk of suicide in other disorders, and is found in up to one-third of completed suicides in community surveys (Isomesta et al., 1996; Soderberg, 2001). Attempts are highly prevalent in BPD, reported in 46% - 92% at time of initial assessment (Black, Blum, Pfohl, & Hale, 2004). With a suicide rate of 3% - 10% and a community prevalence estimated at 1% (Paris, 2010), BPD is a clinically relevant model for studying risk factors associated with suicidal behavior. To identify predictors of suicidal behavior, prospective, longitudinal studies are required, with multidimensional assessments and systematic follow-ups over many years.

Two recent longitudinal studies contributed to our understanding of risk factors for suicidal behavior in BPD and other personality disorders. The McLean Study of Adult Development (MSAD) followed 290 "seriously ill" in-patients with BPD, compared to 72 in-patients with other Axis II disorders, diagnosed by semi-structured interviews and DSM-III-R criteria (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005). The Collaborative Longitudinal Personality Disorders Study (CLPS), enrolled 668 treatment-seeking outpatients with one of four DSM-IV PD diagnoses (26.2% BPD), compared to patients with MDD and no PD (Gunderson et al., 2000). Both studies were designed to assess diagnostic stability and psychosocial outcomes over time. Assessment of suicidal behavior was not a primary aim; however, both studies addressed risk factors which characterized interval attempters. The CLPS characterized attempters at 2- , 3-, and 7-year follow-up intervals (Yen et al. 2003, 2004,(Yen et al., 2005; Yen et al., 2009). Application of their results to BPD is limited by the heterogeneity of the overall study sample, and by a multi-method diagnostic procedure (Gunderson et al.2000). The MSAD used baseline assessments to define characteristics of interval attempters at 16-year follow-up. This approach misses important changes in risk factors which occur over time (Fawcett et al., 1990; Soloff & Chiappetta, 2012a).

By 10 year follow-up, both studies reported remission of BPD symptoms and diagnoses in 85 – 93% of patients, including remission of suicidal and self-injurious behaviors in most patients (Gunderson et al., 2011; Zanarini, Frankenburg, Reich, & Fitzmaurice, 2010). However, psychosocial recovery was poor in both studies, related, in part, to degree of borderline psychopathology (Gunderson et al., 2011) and low vocational attainment (Zanarini et al., 2010). Poor social support, lower educational achievement and unemployment have long been known as risk factors for suicide across diagnoses (Angst et al., 2014; Nock et al., 2008), including BPD and other Cluster B disorders (Heikkinen et al., 1997). Relationships between psychosocial outcomes and suicidal behavior were not addressed in the CLPS and MSAD studies, and are a major focus of the present study.

"Psychobiology of Suicidal Behavior in Borderline Personality Disorder" is a first prospective, multidimensional study of risk factors for suicidal behavior in subjects with BPD. The study seeks predictors of suicidal behavior among pre-defined demographic,

diagnostic, clinical, and psychosocial risk factors assessed at intake and annually. Analyses at 1-, 2-, 4-, and 6-year follow-up intervals affirmed that risk factors associated with suicidal behavior change over time (Soloff & Chiappetta, 2012b). An early finding was that MDD, the only Axis I disorder associated with increased risk, was predictive of suicide attempts only in the first 12 month interval, not in ensuing years. In contrast, measures reflecting illness severity and poor psychosocial function were associated with increased risk of suicidal behavior in every follow-up interval (Soloff & Chiappetta, 2012a; Soloff & Fabio, 2008). Illness severity and poor psychosocial function are discriminating characteristics of BPD subjects with histories of repeat (vs. single) attempts, and with trajectories of increasing medical lethality with recurrence (Soloff & Chiappetta, 2012b).

The Current Investigation

The present analysis sought prospective predictors of suicide attempts among BPD subjects followed a minimum of 8 years. Given the discrepancy between good diagnostic remission in BPD and poor psychosocial recovery reported in both CLPS and MSAD studies, we sought predictors of both suicidal behavior and psychosocial outcomes at 8-year follow-up, and asked if there was a relationship between these two outcomes.

Method

Participants

This study was approved by the University of Pittsburgh IRB. Male and female subjects, between the ages of 18 and 45 years, were recruited from inpatient, outpatient and non-patient (community) sources. Diagnostic interviews were conducted by Master's prepared research clinicians using standardized semi-structured interviews. These included the Structured Clinical Interview for DSM-IV(SCID-I) for Axis I disorders, and the International Personality Disorders Examination (IPDE) for Axis II (First, Spitzer, Gibbon, & Williams, 2005; Loranger, 1999). BPD subjects were required to meet diagnostic criteria for BPD (probable or definite) on the IPDE, with a lifetime time frame, and a score of 8 or more (definite) on the Revised Diagnostic Interview for Borderlines (DIB-R), with a 2 year time frame (Zanarini, Gunderson, Frankenburg, & Chauncey, 1989). Diagnoses were confirmed in a consensus conference of raters, using a best estimate process, and all available data.

Exclusion criteria included a lifetime (past or current) Axis I diagnosis of schizophrenia, delusional (paranoid) disorder, schizoaffective disorder, any bipolar disorder or psychotic depression; clinical evidence of CNS pathology of any etiology, (including seizure disorder, acquired brain injury, or developmental deficits); physical disorders or treatments with known psychiatric consequence, or borderline MR (IQ <70 by WAIS). All subjects provided written informed consent after receiving a complete description of the study,

Measures

The core assessment battery was adapted from the Mental Health Clinical Research Center for the Study of Suicidal Behavior (MHCRC) (J.J. Mann, MD. P.I), and has been presented elsewhere (Soloff, Fabio, Kelly, Malone, & Mann, 2005). Measures from this

multidimensional assessment used in the current study include: 1). the MHCRC Demographic Interview; 2). diagnostic interviews (SCID, IPDE, DIB-R); 3). clinical state assessments (Beck Depression Inventory-2 (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Hamilton Rating Scale for Depression-24 item format (HamD-24) (Guy, 1976), Beck Hopelessness Scale (Beck & Steer, 1988), Global Assessment Scale(GAS) (Endicott, Spitzer, Fleiss, & Cohen, 1976); 4). suicide scales (Columbia Suicide History and Lethality Rating Scale (Oquendo, Halberstam, & Mann, 2003), Suicide Intent Scale, and Scale for Suicidal Ideation (Beck, Beck, & Kovacs, 1975; Beck, Schuyker, & Herman, 1974); 5). personality traits (Barratt Impulsiveness Scale-version-11(BIS) (Barratt, 1965; Barratt & Stanford, 1995), Buss-Durkee Hostility Inventory(BDHI) (Buss & Durkee, 1957), Lifetime History of Aggression, adult score (LHA) (Coccaro, Kavoussi, Berman, & Lish, 1998), MMPI_Psychopathic Deviate subscale (MMPI_Pd) (Hathaway & Meehl, 1951); 6). MHCRC Family History, Abuse History (Soloff, Lynch, & Kelly, 2002); 7.) Social Adjustment Scale-self-report(SAS-sr) (Weissman & Bothwell, 1976), 8). MHCRC Treatment History. The MHCRC Follow-up Interview defined interval changes in demographic, diagnostic, clinical, psychosocial and treatment histories. All clinical state measures, suicide, personality trait, and social adjustment assessments were repeated at annual follow-up.

Statistical Analyses

Baseline variables were compared to 8 year outcomes using t-tests and McNemar's test (McNemar, 1947). If data were not available on the 8 year anniversary date, the nearest values beyond 8 yrs were used. Interval attempters were compared to non-attempters at 8 year follow-up using t-tests and Chi Square tests as appropriate. Significance for differences between groups was determined using Bonferroni correction for multiple comparisons, at p. <0.002. (Group differences of noteworthy trends are reported as such for p.<.05). Suicide attempts were defined by intent to die and consequences requiring medical attention ("medically significant"). "Poor" psychosocial function was defined by a GAS score less than 61; "good" psychosocial function by a GAS score of 61 or greater. The GAS score at 8-year follow-up determined "poor" vs. "good" psychosocial outcomes. For purposes of prospective analyses, independent variables were defined as: a.). baseline diagnostic criteria, b.) baseline personality dimensions (LHA, BIS, MMPI_Pd), and c.) pre-defined risk factors derived from the literature and systematically followed in the longitudinal study. Cox proportional hazards models were used to examine associations between baseline diagnostic criteria, baseline personality dimensions and suicide attempts in the interval using individual regression models. Associations between the pre-defined risk factors and medically significant suicide attempts in the interval were examined as a group using proportional hazards models. To determine predictors of "poor" vs. "good" psychosocial outcome, individual Cox regression models were used to determine associations between baseline diagnostic criteria, baseline personality dimensions, and psychosocial outcome at 8 year follow-up, and between psychosocial outcome and the pre-defined risk factors taken as a group. "Time-to-attempt" (and "time-to-psychosocial outcome") was computed using the difference between the date of the baseline interview and the first medically significant attempt in the 8-year interval (or 8-year GAS score for psychosocial outcomes) (Allgulander & Fisher, 1986). Estimates of relative risk (RR) and associated 95% confidence intervals

(95%c.i.) were obtained for each analysis. Treatment variables (e.g. hospitalization, OPD treatment) were counted only "prior to any attempt," as medically significant suicide attempts in our setting resulted in either inpatient admission or OPD referral.

Results

The study sample consisted of 123 BPD subjects drawn from a database of 323 participants in the longitudinal study. Recruitment source was well balanced between inpatient (35.8%), outpatient (30.9%) and non-patient community volunteers (33.3%). Mean time to follow-up was 8.9 yrs. The overall retention rate in the longitudinal study was 71% for surviving subjects, comparable to the outpatient CLPS with 66% at 10 yrs. (Gunderson et al., 2011).

The sample was 76.4% female, 82.9% Caucasian, predominately of lower socioeconomic status, with 69.7% in Hollingshead Classes IV & V. Minority subjects were predominately African-American and comprised 17.1% of the sample. The mean (s.d.) age at baseline was 28.9 (8.3) yrs. A majority (78.9%) had never married and had no children (72.1%). Mean (s.d.) educational attainment was 14.1(2.2) years; 96.7% were high school graduates. Axis II co-morbidity was diagnosed in 53.7% of subjects, with Antisocial PD most prevalent (14.6%). Histories of childhood sexual abuse were reported by 43.8% of subjects. At intake, 79.7% had prior suicide attempts; 20.3% attempted in the 8-year interval. Axis I co-morbidity, clinical ratings, social and vocational characteristics at baseline and 8-year follow-up are given in Table 1. Interval attempters and non-attempters are compared at 8-year follow-up in Table 2, subjects with "poor" versus "good" psychosocial function at 8 year follow-up in Table 3. A summary of predictor analyses is presented in Table 4.

Clinical, social and vocational outcomes (Table 1)

At baseline, half (49.6%) of subjects had co-morbid Major Depressive Disorder (MDD) and one-third co-morbid alcohol or substance abuse or dependence. While the prevalence of alcohol and substance use disorders decreased significantly by 8-year follow-up, there was remarkably little change in the prevalence of MDD (47.2%). Compared to baseline, significantly fewer subjects had psychiatric hospitalizations in the interval, accompanied by an increase in utilization of OPD treatment. A small but significant improvement was noted in psychosocial functioning (GAS), though the score at 8-year follow-up (59.9) remained within our defined range for "poor" psychosocial outcomes. Similarly, a small but significant improvement was noted in self-rated social and vocational adjustment (SAS-sr) over the 8-year interval. Among clinical measures, subjects improved significantly in depressed mood (HamD), hopelessness, and aggression (LHA). The proportion of subjects meeting the "poor" psychosocial function criterion (GAS<61) dropped from 69.4% at baseline to 51.2% at 8-year outcome (p.= 0.004).

Socio-economic measures demonstrated significant improvement over the 8-year interval in employment and household incomes (measured as "% <20K/ yr"., the U.S. guideline for poverty for a household of three persons (www.hhs.gov)). The number of subjects dependent on government assistance (e.g. SSDI) remained unchanged. After 8 years, there was a trend

for more subjects to be living independently, which we attributed to young adults leaving home.

Interval attempters vs. non-attempters (Table 2)

Among the 123 subjects, twenty-five (20.3%) made medically significant attempts in the 8-year interval: 5 in the 0–2 year interval, 9 between 2–4 years, 5 between 4–6 years and 6 between 6–8 years. Attempters did not differ from non-attempters in age, gender, marital status, or presence of children in the home. They were disproportionately minority subjects (p.= 0.014), recruited as inpatients (p.= 0.003). Although the groups did not differ in SES, attempters had significantly fewer years of formal education. In the 8-year interval, attempters had significantly more hospitalizations than non-attempters (counted prior to any suicide attempts). There was no difference between groups in prevalence of co-morbid Axis I disorders at 8-year follow-up; however, attempters tended to have higher aggression scores (p.= 0.02). Clinical ratings of depression, hopelessness, and hostility did not differ between groups. GAS scores tended to be worse for attempters at 8-year follow-up (p.= 0.03). At baseline, a higher proportion of interval attempters met our criterion for "poor" psychosocial function compared to non-attempters (p.= 0.007), falling slightly short of significance with Bonferroni correction. By 8-year follow-up, the difference between groups was not significant.

Among socio-economic variables, attempters tended to have more frequent changes in employment during the 8-year interval (p.= 0.006); however, there were no significant differences between groups in self-reported social and vocational adjustment (SAS-sr).

"Poor vs. "good" psychosocial outcomes (Table 3)

At 8-year follow-up, subjects with "poor" psychosocial outcomes tended to be older, poorer, and more symptomatic than those with "good" outcomes. They endorsed significantly more MDD, and depressed mood (HamD, BDI) compared to subjects with "good" psychosocial outcomes, with notable trends for greater hopelessness (p. = 0.01), hostility (BDHI) (p.= 0.04), and impulsiveness (BIS) (p. = 0.05). They tended to have more interval hospitalizations (p.= 0.03), and outpatient treatment (p.= 0.05). Social and vocational adjustment (SAS-sr), a self-rated measure, was significantly worse for subjects with "poor" psychosocial outcomes than those with "good" outcomes. Economically, they were more likely to be dependent on government support (p. = 0.007).

Prospective predictors of suicidal behavior and psychosocial outcome (Table 4)

Among baseline diagnostic criteria and personality traits, variables associated with increased risk of attempt behavior in the 8-year interval included: the DIB-R Affect Section score and aggression scores (LHA). Among the pre-defined risk factors, increased risk of suicide attempt in the 8-year interval was associated with: 1). psychiatric hospitalization (prior to any attempt), 2.) inpatient recruitment, 3.) minority race, 4.) changes in employment, and, 5.) aggression scores at follow-up. Decreased risk was associated with more years of full-time education.

Minority race entered the final regression model representing multiple measures of poor socio-economic function. Compared to Caucasian subjects, minority subjects were disproportionately of lower SES at baseline (Hollingshead IV,V) (X^2= 5.20, 1 df, p.=0.02), had lower rates of employment at baseline (X^2= 6.75, 1 df, p.009), and at 8-year follow-up (X^2=6.25, 1 df, p.01), lower household incomes (%<20K) at baseline (X^2=4.71, 1 df, p.03), and at 8-year follow-up (Fisher's Exact Test (FET), p.<.01). Disproportionately more minority subjects were on government support at baseline (X^2= 6.45, 1 df, p.= 0.01), with a similar trend at 8-year follow-up (FET, p.<. 1), compared to Caucasian subjects. At 8-year follow-up, GAS for minority subjects was significantly lower than for Caucasian subjects (t 2.51,120 df, p.= 0.01); however, there was no difference between groups in proportion with "poor" psychosocial outcome (defined by GAS<61) or in self-rated social and vocational assessment (SAS_sr).

Among baseline diagnostic and personality trait measures, increased risk of "poor" psychosocial outcomes at 8-year follow-up was associated with the MMPI_Psychopathic Deviate subscale, multiple measures of impulsiveness (DIB, DIB-R, DSM-III-R), the DIB-R Affect Section and DIB-R Total scores. Among the pre-defined risk factors, risk of "poor" psychosocial outcome at 8-year follow-up was increased solely by co-morbidity with MDD. No variable significantly decreased the risk of "poor" psychosocial outcome.

Discussion

We found no significant relationship between "poor" psychosocial outcome and risk of suicide attempt at 8-year follow-up. Suicide risk was predicted by clinical measures reflecting illness severity, and by economic indicators reflecting poor socio-economic function. Illness severity was represented, at baseline, by the DIB-R Affect Section score, and the personality trait of aggression (LHA). The DIB-R Affect Section score assesses symptoms of depression, anger, anxiety, loneliness, boredom, and emptiness over a two year timeframe, reflecting the vulnerability to negative affectivity and affective instability. The Brown-Goodwin LHA is widely used in research as a measure of impulsive aggression (Coccaro et al., 1998). Higher degrees of impulsive aggression at both baseline and 8-year follow-up increased the risk of suicidal behavior. Negative affectivity, affective instability, and impulsive aggression are temperamental traits associated with suicidal behavior across diagnoses. In a stress-diathesis model of suicide, they contribute a biologic vulnerability to suicidal behavior at times of stress (Koenigsberg et al., 2002; McGirr, Paris, Lesage, Renaud, & Turecki, 2007; Oquendo et al., 2004; Yen et al., 2004). These specific dimensions of personality, not overall severity of BPD, predicted suicidal behavior. Illness severity was also reflected in clinical data: inpatient recruitment and psychiatric hospitalizations prior to any attempts in the interval. A history of psychiatric hospitalization also predicted suicidal behavior at 1-year, 2-year, and 4-year follow-ups (Soloff & Chiappetta, 2012a).

Poor socio-economic function as a risk factor for suicidal behavior was represented by minority race, changes in employment, and years of full-time education. Minority race was significantly associated with lower SES, less employment, lower household incomes, and more government support, but not with psychosocial outcome. Low SES predicted suicidal behavior in our 6-year follow-up (12). Poor socio-economic functioning was not directly

associated with increased suicide risk at 8-year follow-up, but indirectly related through minority race.

Poor psychosocial outcome (defined by GAS<61 at 8 year follow-up) was predicted by baseline diagnostic criteria and personality traits reflecting negative affectivity, impulsivity, and antisocial behavior, i.e. similar to traits associated with increased suicide risk. The statistical independence of poor psychosocial outcome and suicidal risk was unexpected, and may be attributed, in part, to the definition of the GAS, which confounds descriptions of psychopathology with levels of social and vocational functioning. As in the CLPS and MSAD studies, psychopathology in our subjects improved more rapidly and to a greater extent than vocational functioning. Our subjects showed modest statistical improvement in both domains; however, the <u>absolute</u> level of vocational and economic attainment remained quite poor.

For a majority of BPD patients, suicidal behavior is not a chronic symptom, but remits over time. In the MSAD study, incidence of "manipulative suicide efforts" decreased from 56.4% of patients at 2 yr. follow-up, to 4.2% at 10 years (Zanarini et al., 2008; Zanarini et al., 2007). The independence of psychosocial outcome and suicide risk in our study has important clinical relevance. By 8 year follow-up, poor psychosocial function does not increase risk for suicide attempts. Conversely, an early history of suicide attempts does not necessarily determine a poor psychosocial outcome in long term follow-up.

It is noteworthy that only one co-morbid Axis I disorder, MDD, contributed to poor psychosocial outcomes, the others having remitted over the 8-year interval. The high prevalence of MDD at follow-up was unexpected in light of the large number of subjects (75.6%) who had OPD treatment in the interval. MDD was a predictor of suicide attempt in the first 12 month interval of this study, but not in subsequent years. Outpatient treatment significantly decreased attempt risk in the 12 month and 6-year follow-up analyses (Soloff & Fabio, 2008), and may have contributed to the diminished effect of MDD on attempt risk. However, by 8 years of follow-up, treatment variables no longer have a significant effect on suicide risk.

The continuing high prevalence of MDD is consistent with the borderline patient's affective instability, negative affectivity, and vulnerability to depressive moods, but may also reflect chronic personality traits such as low self esteem, pessimism, helplessness, and hopelessness. Many BPD patients report feeling intrinsically "bad," "worthless," or "unlovable," as part of their core identity. These attitudes motivate much of the borderline patient's self-injurious behavior, and may contribute to a diagnostic impression of MDD. Although not predictive of suicide risk at 8-year follow-up, MDD, hopelessness, and depressed mood significantly contribute to poor psychosocial outcomes (Table 3). Symptoms reflecting negative affectivity in BPD are among the most refractory to change over time (Zanarini et al., 2007), and may adversely impact both social and vocational functioning.

Socio-economic risk factors in BPD

Retrospective studies of suicides with BPD and other Cluster B disorders cite poor educational and vocational attainment as putative risk factors (Heikkinen et al., 1997; Runeson & Beskow, 1991). In prospective cross-sectional studies, poor social and vocational adjustment is associated with suicide attempts among BPD inpatients (Kelly, Soloff, Lynch, Haas, & Mann, 2000), among BPD subjects with recurrent attempts, and among BPD subjects with high lethality attempts in longitudinal studies (Soloff & Chiappetta, 2012b; Soloff et al., 2005). In community surveys, subjects with BPD have lower educational attainment and less employment than subjects with other PDs, including ASPD (Cloninger, Bayon, & Przbeck, 1997). Higher educational achievement is a buffer against suicidal behavior in our study.

The levels of occupational and educational achievement in our subjects are comparable to those in the MSAD study. At 8-year follow-up, our subjects reported a 59.2% rate of full time employment or school attendance compared to 55.1% at 10 year follow-up in the MSAD study. (Corresponding unemployment remains high at 40.8% and 44.9%, respectively) (Zanarini, Jacoby, Frankenburg, Reich, & Fitzmaurice, 2009). Despite modest but significant improvement in household incomes over the 8-year interval, 46.2% of our subjects remain below the U.S. federal poverty level for personal income, and 41.7% for household incomes. Another core indicator of economic function is the proportion of subjects requiring some form of government assistance for basic subsistence, e.g. SSDI. At time of intake, the MSAD study found 40.7% of BPD in-patients receiving SSDI, with little change after 10 years of follow-up (44.2%) (Zanarini et al., 2009). Our sample was less impaired at intake, reflecting a balanced mix of inpatients, outpatients, and non-patient volunteers. At time of recruitment, 25.6% were on government assistance, with little change (24%) at 8-year follow-up. While there was statistically significant improvement in some economic indicators, (e.g. employment, household income), the absolute level of vocational and economic attainment at 8-year follow-up remains low. A similar conclusion was drawn in the CLPS and MSAD studies using measures defined as "functional remission" or "psychosocial recovery".

"Functional remission" in CLPS was defined by a GAF score 70, sustained for 2 months. (The GAF is derived from the GAS, with similar structure.) By 10 year follow-up, only 21% of BPD subjects achieved this goal (Gunderson et al., 2011). In the MSAD study, "good psychosocial recovery" was defined by a GAF 61, (with an emotionally sustaining relationship and competency in full time work or school.) Only 40% achieved good psychosocial recovery by 10 year follow-up (Zanarini et al., 2010; Zanarini, Frankenburg, Reich, & Fitzmaurice, 2012). Failure to achieve this outcome was overwhelmingly attributable to vocational failure (in 93.9% of cases), not social failure (2.4%) (Zanarini et al., 2010). BPD subjects in the CLPS were less apt to have employment than comparison groups by 10 year follow-up, with only one-third achieving full time employment; however, there was no difference between groups in social functioning (Gunderson et al., 2011). Our subjects reported modest but significant improvements in overall psychosocial functioning (GAS), self-reported social and vocational adjustment (SAS-sr) at 8-year follow-up; however, 46.5% still met our criterion for poor psychosocial outcome (GAS<61). Despite

differences in research aims and methods, our results support the major findings of the CLPS and MSAD studies. For the majority of borderline patients, symptomatic improvement is the expected long term outcome; however, vocational and economic achievement lag far behind.

Differences in outcome between these studies may be attributed, in part, to illness severity of participants, and length of follow-up. In our study, recruitment was evenly balanced between inpatient, outpatient and non-patient community sources, potentially moderating the degree of illness severity in our overall sample. This was reflected in our mortality experience. Among 13 deaths in our current longitudinal study, there has been only one coroner-certified suicide (0.3% of total); and 8 "lifestyle" (drug or alcohol) related deaths, officially certified as "accidental". Our suicide rate is comparable to the outpatient CLPS experience at 7 years (0.86%), but low compared to the MSAD study of former BPD inpatients (4%) at 10 yrs. However, attempt rates are remarkably similar across studies. An attempt rate of 20.2% at 8 year follow-up in this study is compatible with both the CLPS (18.4% at 7 years) and MSAD studies (14.1% at 8 yrs.). Suicide attempts in BPD are often impulsive, help-seeking behaviors, with little intent to die and low degrees of medical lethality.

Our sample was limited to subjects who completed 8 years in an ongoing longitudinal study. Incidence of suicidal behavior, diagnostic remission and recovery, social and vocational achievements may differ with longer follow-up. Although we compared our results to the CLPS and MSAD studies at comparable follow-up intervals, the MSAD study continues to report improved symptomatic functioning in BPD subjects followed for 16 years and beyond (Zanarini, M. C., Frankenburg, F. R., Reich, D. B., & Fitzmaurice, G. (2012)).

Clinical Relevance

The independence of suicide risk and poor psychosocial outcome suggests that poor psychosocial function, per se, does not increase risk of suicidal behavior. Conversely, a history of suicidal behavior (especially early in the course), does not necessarily mean a poor psychosocial outcome. Predictors of suicidal behavior and poor psychosocial outcomes include characteristic BPD personality traits such as negative affectivity, affective instability, and impulsive aggression. These are potentially modifiable risk factors and targets for focused and sustained treatment. Similarly, aggressive treatment of chronic depressive symptoms may moderate poor psychosocial outcomes. Educational and vocational deficits in patients with BPD, especially among minority populations, contribute a long term vulnerability to suicidal behavior. These socio-economic deficits develop early in the course of BPD, related, in part, to disruptive effects of the illness on educational and vocational opportunities. They are not addressed by current therapies for BPD. Rehabilitation models for BPD have been proposed to address these needs (Links, 1993), but have not been widely adopted.

Acknowledgements:

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Table 1:

Sample Characteristics at baseline and 8-year follow-up

A. Clinical Characteristics			
Variable	**Baseline n=123**	**8-year Follow-up N=123**	**Statistic , df, p-value**
Major Depressive Disorder (%MDD)	49.6	47.2	McN=0.07, df 1, 0.79
Alcohol abuse/dependence (%ALC)	35.0	7.3	McN=28.66, df 1, <0.001[*]
Substance use Disorder (%SUD)	33.3	4.1	McN=30.63, df 1, <0.001[*]
Post-Traumatic Stress Disorder (%PTSD)	12.2	3.3	McN=5.26, df 1, 0.02
Hospitalization (% yes before attempt)	69.1	29.3	McN=72.01, df 1, <0.001[*]
OPD treatment (% yes before attempt)	17.9	75.6	McN=55.39, df 1, <0.001[*]
Social Adjustment Scale (SAS-SR)	2.53(0.57)	2.22(0.61)	t=4.99, df 99, <0.001[*]
Global Assessment Scale (GAS)	53.3(12.6)	59.9(12.3)	t=4.46, df 120, <0.001[*]
Hamilton Depression (HamD)	20.2(8.3)	14.4(10.4)	t=5.23, df 93, <0.001[*]
Beck Hopelessness Scale	11.5(6.1)	8.8(6.5)	t=3.74, df 53,<0.001[*]
Barratt Impulsiveness Scale (BIS)	75.7(4.5)	74.5(7.0)	t=1.53, df 91, 0.13
Buss-Durkee Hostility Inventory (BDHI)	43.8(12.6)	40.0(21.2)	t=1.21, df 49, 0.23
Aggression, Adult (Brown-Goodwin LHA)	23.2(6.5)	15.6(4.7)	t=8.59, df 73, <0.001[*]
B. Social and Vocational Characteristics			
Employment (% yes)	39.8	59.2	McN=10.03, df 1, 0.002
Household Income (% <20K)	60.4	41.7	McN=10.32, df 1, 0.001[*]
Personal Income (% <10K)	60.4	46.2	McN=4.17, df 1, 0.04
Source of Income (% on gov't. support)	25.6	24.0	McN=0.04, df 1, 0.85
Living Arrangement (% alone)	24.6	35.2	McN=3.69, df 1, 0.055
SES (Hollingshead % Cl. IV,V)	69.7	59.3	McN=2.44, df 1, 0.12
Poor Psychosocial Function (%GAS<61)	69.4	51.2	McN=8.48, df 1, 0.004

McN = McNemar's test,

[*] Bonferroni correction for multiple comparisons, p.<.002

TABLE 2.

ATTEMPTERS AND NON-ATTEMPTERS AT 8 YR. FOLLOW-UP

1. Demographic Variables	Non-Attempter (n=98)	Attempter (n=25)	Statistic , df, p-value
Age (@ long term FU)	37.9 ± 8.6	39.4 ± 7.6	t=0.80, df 122, 0.43
Education (@ baseline, # years FT)	14.4 ± 2.3	13.0 ± 1.7	t=3.35, df 122, 0.002
Sex (% female)	75.5	80.0	χ^2=0.22, df 1, 0.79
Source of Recruitment Inpatient Outpatient Non-patient	28.6 33.7 37.8	64.0 20.0 16.0	χ^2=11.02, df 2, 0.003
Race (% Caucasian)	87.8	64.0	FET, 0.014
Religion (% none)	26.5	29.2	χ^2=0.07, df 1, 0.80
Married (% no)	73.5	72.0	χ^2=0.02, df 1, 0.88
Children (% none)	70.1	64.0	χ^2=0.35,df 1, 0.56
Family History of Suicide (% yes)	1.6	4.3	FET, 0.47
2. Socio-economic Variables			
SES (% Hollingshead Cl. IV,V)	57.6	63.6	χ^2=0.27,df 1, 0.61
Lives Alone (% yes)	35.5	37.5	χ^2=0.02, df 1, 0.88
Source of Income (% on gov't. support)	22.4	28.0	χ^2=0.34, df 1, 0.56
Household Income (% <20K)[1]	69.4	88.0	χ^2=3.52,df 1, 0.06
Patient Personal Income (% <10K)[2]	47.4	64.0	χ^2=2.19, df 1, 0.14
Change in Employment (%yes)	34.0	64.0	χ^2=7.43, df 1, 0.006
3. Clinical Variables			
Hospitalization (%yes before any att.)	20.4	64.0	χ^2=18.28, df 1, <0.001[*]
Outpatient Tx. (% yes before any att.)	73.5	68.0	χ^2=0.30, df 1, 0.59
Major Depressive Disorder (MDD)	44.9	56.0	χ^2=0.99,df 1, 0.32
Substance use Disorder (SUD)	3.1	8.0	FET, 0.27
Alcohol abuse/dependence (ALC)	7.1	8.0	FET, 1.00
Post-Traumatic Stress Disorder (PTSD)	3.1	4.0	FET, 1.00
Beck Depression Inventory	17.63 ± 13.7	21.27 ± 16.08	t=0.91,df 77, 0.36
Aggression, Adult (Brown-Goodwin LHA)	14.84 ± 3.94	19.07 ± 6.14	t=2.55, df 16.9, 0.02
Barratt Impulsiveness Scale (BIS)	74.05 ± 7.33	75.82 ± 4.39	t=1.08, df 100, 0.28
Buss-Durkee Hostility Inventory (BDHI)	38.56 ± 17.90	38.87 ± 27.13	t=0.04, df 18.2, 0.97
Hamilton Depression (HamD)	13.22 ± 10.07	16.61 ± 11.44	t=1.27, df 99, 0.21
Beck Hopelessness Scale	8.34 ± 6.79	9.21 ± 7.11	t=0.42,df 56, 0.68
Social Adjustment Scale (SAS-SR)	2.20 ± 0.63	2.23 ± 0.59	t=0.21,df 108, 0.84
Global Assessment Scale (GAS)	61.43 ± 10.75	53.92 ± 15.88	t=2.23, df 30, 0.03
Poor psychosocial function @ BL (%GAS<61)	64.3	92.0	X2=7.27, df 1, 0.007
Poor psychosocial function @ 8y (%GAS<61)	46.9	68.0	χ^2=3.54, df 1, 0.06

(1) $20,000 is the Federal definition of poverty for a household of three persons,

(2) $ 10,000 for a single person household (www.hhs.gov) , FET = Fisher's Exact Test,

*
  Bonferroni correction for multiple comparisons, p.<.002

TABLE 3.

POOR VS. GOOD PSYCHOSOCIAL OUTCOMES AT 8 YR. FOLLOW-UP

1. Demographic Variables	Good Psychosocial Outcome (n=64)	Poor Psychosocial Outcome (n=57)	Statistic,df, p
Age (@ long term FU)	35.9 ± 8.1	40.2 ± 8.2	t=2.88, df 119, 0.005
Education (@ baseline, # years FT)	14.1±2.4	14.2±2.0	t=0.02, df 118, 0.99
Sex (% female)	71.2	82.3	X^2=2.08, df 1, 0.15
Source of Recruitment Inpatient Outpatient Non-patient	40.7 30.5 28.8	29.0 32.3 38.7	X^2=2.08, df 2, 0.35
Race (% Caucasian)	83.1	82.3	X^2=0.013, df 1, 0.91
Religion (% none)	25.4	29.5	X^2=0.25,df 1, 0.62
Married (% no)	76.3	69.4	X^2=0.73, df 1, 0.39
Children (% none)	29.3	33.9	X^2=0.29, df 1, 0.71
Family History of Suicide (% yes)	0.0	4.3	FET, 0.50
Family hx. of Substance abuse (%yes)	24.3	47.7	X^2=4.72,df 1, 0.03
2. Socio-economic Variables			
SES (% low)	50.0	65.6	X^2= 2.81, 0.09
Lives Alone (% yes)	28.8	41.9	X^2=2.27, df 1, 0.13
Source of Income (% on gov't. support)	14.1	35.1	X^2=7.31, df 1, 0.007
Household Income (% <20K)	66.1	80.6	X^2=3.29, df 1, 0.07
Patient Personal Income (%- <10K)	49.2	51.6	X^2=0.07, df 1, 0.79
Change in Employment (%yes)	39.0	40.3	X^2=0.23, df 1, 0.88
3. Clinical Variables			
Hospitalization (%yes before any attempt)	3.4	14.5	X^2=4.53, df 1, 0.03
Outpatient Tx (% yes before any attempt)	59.3	75.8	X^2=3.76, df 1, 0.05
Suicide attempt(%yes in interval)	13.6	27.4	X^2=3.54, df 1, 0.06
Major Depressive Disorder (MDD)	23.7	69.4	X^2=25.26, df 1, <0.001 [*]
Substance use Disorder (SUD)	1.7	6.5	FET, 0.37
Alcohol abuse/dependence (ALC)	8.5	4.8	FET, 0.48
Post-Traumatic Stress Disorder (PTSD)	3.4	3.2	FET, 1.00
Beck Depression Inventory (BDI)	10.7±9.0	25.5±14.5	t=5.49, df 63.3, <0.001 [*]
Aggression, Adult (Brown-Goodwin LHA)	14.9±4.1	16.7±5.3	t=1.74, df 75, 0.09
Barratt Impulsiveness Scale (BIS)	73.1±8.2	75.7±5.0	t=2.59, df 100, 0.05
Buss-Durkee Hostility Inventory (BDHI)	33.1±22.1	44.1±17.1	t=2.16, df 58, 0.04
Hamilton Depression (HamD)	8.9±8,5	17.8±10.0	t= 4.76, df=99,<0.001 [*]
Beck Hopelessness Scale	6.3±6.3	10.8±6.7	t=2.59, df 56, 0.01
Social Adjustment Scale (SAS-SR)	2.0±0.52	2.5±0.6	t=4.72, df 108, <0.001 [*]

FET = Fisher's Exact Test,

*
Bonferroni correction for multiple comparisons, p.<.002

Table 4.

PREDICTORS OF INTERVAL SUICIDE ATTEMPTS AND POOR PSYCHOSOCIAL OUTCOMES [*]

A. BASELINE DIAGNOSTIC AND PERSONALITY VARIABLES			
INCREASED RISK OF ATTEMPTS			
Variable	**RR**[*]	**95% CI**	**p-value**
DIB-R Affect Section Score	1.81	0.83–3.91	0.036
Aggression, adult (LHA)	1.18	1.08–1.30	<0.001
B. PRE-DEFINED RISK FACTORS			
INCREASED RISK OF ATTEMPTS			
Variable	**RR**	**95% CI**	**p-value**
Change of Employment	3.15	1.39–7.14	0.006
Hospitalization Prior to Attempt [**]	5.33	2.35–12.10	<0.001
Minority (non-Caucasian) Race	3.30	1.45–7.47	0.004
Recruitment Source Inpatient (vs. non-patient) Inpatient (vs. out-patient)	4.35 3.09	1.45–13.03 1.13–8.46	0.009 0.03
Aggression, adult (LHA)	1.15	1.07–1.25	<0.001
DECREASED RISK OF ATTEMPTS			
Variable	**RR**	**95% CI**	**p-value**
Total Years of Full-time Education	0.71	0.56–0.91	0.006
C. BASELINE DIAGNOSTIC AND PERSONALITY VARIABLES			
INCREASED RISK OF POOR PSYCHOSOCIAL OUTCOME(GAS<61)			
Variable	**RR**	**95% CI**	**p-value**
MMPI_ Psychopathic Deviate Score	1.10	1.03–1.17	0.004
DIB Impulse Action Subscale	1.21	1.08–1.35	0.001
DIB-R Affect Section Score	1.30	1.09–1.54	0.003
DIB-R Impulse Action Patterns Score	1.22	1.07–1.39	0.003
Impulsiveness in at least two areas (DSM3R)	2.36	1.10–5.06	0.028
DIB-R Total Score	1.06	1.02–1.11	0.005
D. PRE-DEFINED RISK FACTORS			
INCREASED RISK OF POOR PSYCHOSOCIAL OUTCOME(GAS<61)			
Variable	**RR**	**95% CI**	**p-value**
MDD	3.10	1.78–5.39	<0.001

[*] Baseline diagnostic and personality variables were assessed in individual Cox regression models; Pre-defined risk factors were assessed in a single group model.

[**] NOTE: "Prior to Attempt" indicates that the hospitalization took place prior to any suicide attempt within the interval of baseline to 8 years.