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The Relationship of Chronic Medical Illnesses, Poor Health-Related Lifestyle Choices, and Health Care Utilization to Recovery Status in Borderline Patients over a Decade of Prospective Follow-up

Alex S. Keuroghlian, M.D., M.Sc.^{a,b}, Frances R. Frankenburg, M.D.^{a,c}, and Mary C. Zanarini, Ed.D.^{a,b}

^aLaboratory for the Study of Adult Development, McLean Hospital, Belmont, MA 02478, United States

^bDepartment of Psychiatry, Harvard Medical School, Boston, MA 02115, USA

^cDepartment of Psychiatry, Boston University School of Medicine, Boston, 02118 MA, United States

Abstract

Background—The interaction of borderline personality disorder (BPD) with physical health has not been well characterized. In this longitudinal study, we investigated the long-term relationship of chronic medical illnesses, health-related lifestyle choices, and health services utilization to recovery status in borderline patients over a decade of prospective follow-up.

Method—264 borderline patients were interviewed concerning their physical health at 6-year follow-up in a longitudinal study of the course of BPD. This sample was then reinterviewed five times at two-year intervals over the next ten years. We defined recovery from BPD based on a Global Assessment of Functioning score of 61 or higher, which required BPD remission, one close relationship, and full-time competent and consistent work or school attendance. We controlled for potentially confounding effects of time-varying major depressive disorder.

Results—Never-recovered borderline patients were significantly more likely than ever-recovered borderline patients to have a medical syndrome, obesity, osteoarthritis, diabetes, urinary incontinence, or multiple medical conditions ($p < 0.0063$). They were also significantly more likely to report pack-per-day smoking, weekly alcohol use, no regular exercise, daily sleep medication use, or pain medication overuse ($p < 0.0083$). In addition, never-recovered borderline

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Contact Information for the Corresponding Author: Name: Alex S. Keuroghlian, M.D., M.Sc., Mail: McLean Hospital, 115 Mill Street, Belmont, MA, 02478, Telephone: (617) 855-3092, Fax: (617) 855-3580, akeuroghlian@partners.org.

CONFLICT OF INTEREST:

All authors declare that they do not have any conflicts of interest.

CONTRIBUTORS:

Mary C. Zanarini designed the study and wrote the protocol. Alex S. Keuroghlian managed the literature searches, undertook the statistical analysis, and wrote the first draft of the manuscript. Frances R. Frankenburg and Mary C. Zanarini contributed to the writing of the manuscript. All authors have approved the final manuscript.

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patients were significantly more likely than ever-recovered borderline patients to undergo a medical emergency room visit, medical hospitalization, X-ray, CT scan, or MRI scan ($p < 0.0063$).

Conclusions—Over a decade of prospective follow-up, failure to recover from BPD seems to be associated with a heightened risk of chronic medical illnesses, poor health-related lifestyle choices, and costly health services utilization.

Keywords

borderline personality disorder; longitudinal course; recovery; chronic medical illness; health care utilization; major depressive disorder

INTRODUCTION

Little is known about the relationship between borderline personality disorder and physical illness. Few studies have attempted to characterize the association of borderline personality disorder with medical co-morbidities and health care utilization. One early study showed a relationship between symptoms of borderline personality disorder and obesity (Sansone et al., 2001). A recent study found a significant relationship between the presence of borderline personality disorder and higher rates of arteriosclerosis, arthritis, cardiovascular disease, gastrointestinal disease, hypertension, liver disease, venereal disease, and “any assessed medical condition” (El-Gabalawy et al., 2010). Previous research has also reported correlations between the presence of borderline personality disorder and use of higher numbers of primary care physicians and medical specialists (Sansone et al., 2011), as well as increased utilization of medical office visits (Ansell et al., 2007; Sansone et al., 1996; Sansone et al., 1998), telephone calls to medical offices (Sansone et al., 1998), medication prescriptions (Sansone et al., 1996; Sansone et al., 1998), emergency room visits (Black et al., 2006), and inpatient hospitalizations (Black et al., 2006). Another recent study of adults between 55 and 64 years of age found that the number of BPD features predicts negative health perceptions, decreased physical functioning, more role limitations and more pain at baseline, as well as more negative health perceptions, lower energy, higher health care utilization, and more medication usage six months later (Powers & Oltmanns, 2012).

In 2004, we published the first study to examine medical health in a well-diagnosed sample of remitted and non-remitted borderline patients (Frankenburg & Zanarini, 2004). We found that non-remitted borderline patients were more likely than remitted patients to have a syndrome-like medical condition, specifically chronic fatigue, fibromyalgia, or temporomandibular joint syndrome (TMJ). Borderline patients who had not achieved remission also had a higher prevalence of certain chronic medical conditions, particularly back pain, diabetes, hypertension, obesity, osteoarthritis, and urinary incontinence. In addition, we observed that non-remitted borderline patients more often reported poor self-care in the form of pack-per-day smoking, daily alcohol use, daily sleep medication use, lack of regular exercise, and overuse of pain medications. Finally, non-remitted borderline patients were more likely to undergo a medically-related emergency room visit, a medical hospitalization, or both.

The current study is the first to describe the long-term longitudinal course of chronic medical illnesses, health-related lifestyle choices, and utilization of health care services in borderline patients. Specifically, we assessed the relationship of these medical variables among patients who recovered from BPD versus borderline patient who never recovered over a decade of prospective follow-up. Given existing evidence for a relationship between major depressive disorder (MDD) and higher rates of both general medical illness and increased health services utilization, (Druss et al., 2000; Katon, 2003; Simon et al., 1995a; Simon et al., 1995b) we also controlled for potential confounding effects of time-varying

MDD on participants' physical health, health-related self-care, and health care utilization. This extends our initial cross-sectional design that compared non-remitted borderline patients with remitted borderline patients. We hypothesized that patients who never recovered from BPD would be more likely than borderline patients who recovered to have a poorly defined medical syndrome or other chronic medical condition over ten years of follow-up. We also hypothesized that patients who never recovered from BPD would be more likely to make poor health-related lifestyle choices than borderline patients who recovered over a decade of follow-up. Additionally, we hypothesized that patients who never recovered from BPD would be more likely to utilize costly medical services than borderline patients who recovered over a prospectively observed period of ten years. Finally, we hypothesized that patients who never recovered from BPD would be more likely to face financial challenges related to their health status than borderline patients who recovered over a decade of follow-up.

METHODS

The current study is part of a multifaceted longitudinal study of the course of borderline personality disorder – the McLean Study of Adult Development (MSAD). 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 patients were initially inpatients at McLean Hospital in Belmont, Mass. Each patient was screened to determine that he or she was 18 to 35 years of age, had a known or estimated IQ of 71 or higher, had no history or current symptomatology of schizophrenia, schizoaffective disorder, bipolar I disorder, or an organic condition that could cause psychiatric symptoms, and was fluent in English.

After the study procedures were explained at baseline, written informed consent was obtained. Each patient then met with a master's-level interviewer blind to the patient's clinical diagnoses. Three semistructured diagnostic interviews were administered: the Structured Clinical Interview for DSM-III-R Axis I Disorders (SCID-I) (Spitzer et al., 1992), the Revised Diagnostic Interview for Borderlines (DIB-R) (Zanarini, 1989), and the Diagnostic Interview for DSM-III-R Personality Disorders (DIPD-R) (Zanarini et al., 1987). Good-to-excellent levels of interrater and test-retest reliability were achieved at baseline for both axis I and II disorders (Zanarini & Frankenburg, 2001; Zanarini et al., 2002).

Patients were interviewed six times from June 1998 through December 2010. At each 24-month follow-up wave, diagnostic information was assessed via interview methods similar to the baseline procedures by staff members blind to baseline diagnoses. After informed consent was obtained, the MSAD diagnostic battery was re-administered (a change version of the SCID-I, the DIB-R, and the DIPD-R). Good-to-excellent interrater reliability was maintained throughout the course of the study for both axis I and II diagnoses (Zanarini et al., 2001; Zanarini et al., 2002).

At 6-year follow-up and at each subsequent follow-up wave, the Medical History and Services Utilization Interview (MHSUI) was administered to all patients by a well-trained interviewer. The MHSUI assesses the health of the patients, lifestyle issues related to physical health, and health care utilization (Frankenburg & Zanarini, 2004). Interviewers prompted participants to clarify their answers to MHSUI questions as needed. Medical diagnoses were not recorded unless they had been given to the subject by a physician. Medical services that were related to pregnancy were not included in the estimates of health care utilization.

In a validation study involving 14 patients, the following kappa values (κ) were found after comparing patient report and medical record information: any serious medical condition in patient ($\kappa=0.91$), any serious medical condition in first-degree relative ($\kappa=0.77$), any traditional medical treatment ($\kappa=0.88$), and any alternative treatment ($\kappa=0.43$). For quantitative measures, the following intraclass correlation (p) coefficients were also found: number of visits to primary care physician ($p=0.72$), number of visits to specialists ($p=0.68$), and number of high-risk lifestyle issues ($p=0.61$). The interrater reliability of this measure has been assessed in 21 conjoint interviews. Kappa values pertaining to patient medical conditions ranged from 0.45 to 1.0, with a median of 1.0. Kappa values pertaining to lifestyle issues ranged from 0.89 to 1.0, with a median of 1.0. Kappa values pertaining to medical treatments ranged from 0.64 to 1.0, with a median of 1.0.

Body mass index (BMI) was computed for all subjects using their self-reported height and weight at each follow-up. BMI was calculated by dividing the weight in kilograms by the square of the height in meters. Obesity was defined as having a BMI of 30 kg/m² or higher (Mokdad et al., 2003).

Our measure of recovery was a GAF score of 61 or higher (which none of our participants had at baseline). This outcome measure offers a reasonable description of a good overall outcome—some mild symptoms or some difficulty in social, occupational, or school functioning but generally functioning fairly well and having some meaningful interpersonal relationships. We operationalized this score to enhance its reliability and meaning. To be given a GAF score of 61 or higher, a borderline patient typically had to be in remission from BPD (defined as no longer meeting DIB-R and DSM-III-R criteria for BPD for a period of at least two years), have at least one emotionally sustaining relationship with a close friend or life partner or spouse, and be able to work or go to school consistently, competently, and on a full-time basis. Recovery status was assessed at each two-year follow-up: participants who recovered from BPD during the 10-year longitudinal study period were categorized as “ever recovered” and those who did not were categorized as “never recovered.”

Generalized estimating equations, with BPD recovery status (ever recovered versus never recovered) and time as main effects of interest, were used in longitudinal analyses of prevalence data. Tests of recovery status by time interactions were conducted and none were found to be significant. These analyses modeled the log prevalence, yielding an adjusted relative risk ratio (RRR) and 95% confidence interval (95% CI) for recovery status and time. Given the well-established relationship between MDD and both medical comorbidity and health care utilization, in addition to MDD being most prevalent among comorbid axis I disorders in borderline patients at our 6-year follow-up (61.4%; Zanarini et al, 2004a), time-varying MDD was included as a covariate in all analyses to control for potential confounding effects of this variable. Although there is also an existing literature describing the relationship of socioeconomic status to physical health and health services utilization (Adler & Ostrove, 1999; Braveman et al., 2005), we did not control for potential confounding effects of socioeconomic status because recovered borderline patients had a higher socioeconomic status than never-recovered borderline patients due to the difference in their vocational adjustment.

Given the large number of comparisons, we applied the Bonferroni correction for multiple comparisons to each of the four types of medical variables studied. This resulted in the following adjusted alpha levels: chronic medical conditions ($0.05/8=0.0063$), poor health-related lifestyle choices ($0.05/6=0.0083$), costly medical service utilization ($0.05/8=0.0063$), and outpatient care/financial challenges related to medical illness ($0.05/6=0.0083$).

RESULTS

Briefly, there were two hundred and sixty-four borderline patients at 6-year follow-up. Among borderline participants at 6-year follow-up, 80.7% (N=213) were women and 87.5% (N=231) were white. Their average age was 33.0 years (SD=5.9) and the mean socioeconomic status was 3.4 (SD=1.4) (where 1=highest and 5=lowest) (Hollingshead, 1957). Borderline participants at 6-year follow-up had a mean GAF score of 54.2 (SD=13.2), indicating moderate symptoms or moderate difficulty in social, occupational, or school functioning.

Attrition was low. A total of 255 borderline patients were reinterviewed at the 8-year assessment (two deaths due to physical illness), 249 at the 10-year assessment (one suicide and one death due to physical illness), 244 at the 12-year assessment (one suicide and two deaths due to physical illness), 238 at the 14-year assessment (two deaths due to physical illness), and 231 at the 16-year assessment (two deaths due to physical illness).

Table 1 details the prevalence of chronic medical conditions in ever-recovered and never-recovered borderline patients over a decade of prospective follow-up. As this table shows, a significantly higher percentage of never-recovered borderline patients than ever-recovered borderline patients reported being diagnosed with a medical syndrome (chronic fatigue, fibromyalgia, or TMJ), obesity, osteoarthritis, diabetes, urinary incontinence, or multiple medical conditions. The higher prevalence of hypertension (RRR=0.60, $p=0.034$) and chronic back pain (RRR=0.78, $p=0.022$) among never-recovered borderline patients compared to ever-recovered patients was not significant after Bonferroni correction. When all participants were considered together, the rates of all chronic medical conditions, except for syndromes, obesity, and urinary incontinence, increased significantly over time.

As the RRR for recovery status and time in Table 1 contains much detailed information, we believe an example would be helpful. As can be seen, 4% of ever-recovered borderline patients, and about 16% of never-recovered borderline patients had a diagnosis of osteoarthritis at 6-year follow-up. By the time of 16-year follow-up, these prevalence rates had increased to about 12% and 27%, respectively. The RRR of 0.43 for recovery status indicates that never-recovered borderline patients were more than twice as likely to report a diagnosis of osteoarthritis than borderline patients who had ever recovered ($1/0.43=2.33$). The RRR of 2.22 for time indicates that the likelihood of being diagnosed with osteoarthritis over a decade of prospective follow-up for all participants considered together increased by 122% ($2.22 - 1 \times 100\%$).

Table 2 shows the prevalence of poor health-related lifestyle choices in ever-recovered and never-recovered borderline patients over a decade of prospective follow-up. Compared with participants who ever recovered from BPD, never-recovered borderline patients reported significantly higher rates of pack-per-day smoking, weekly alcohol use, lack of regular exercise, daily use of sleep medication, overuse of pain medications, or multiple poor health-related lifestyle choices. When all participants were considered together, the rate of weekly alcohol use and daily sleep medication use increased significantly over time, whereas lack of regular exercise and overuse of pain medication decreased significantly over time.

As an example to illustrate the more detailed information in Table 2, it can be seen that about 42% of ever-recovered borderline patients and about 66% of never-recovered borderline patients had no regular exercise at 6-year follow-up. By the time of 16-year follow-up, these prevalence rates had decreased to about 28% and 56%, respectively. The RRR of 0.63 for recovery status indicates that never-recovered borderline patients were

about 1.6 times more likely to have no regular exercise than participants who had recovered ($1/0.63=1.59$).

Table 3 shows the prevalence of costly medical service utilization in ever-recovered and never-recovered borderline patients over a decade of prospective follow-up. Compared with borderline patients who had ever recovered, never-recovered patients reported significantly higher rates of medical emergency room visits, medical hospitalizations, both an emergency room visit and a medical hospitalization, and all imaging studies and procedures other than ultrasound and colonoscopy. The higher prevalence of colonoscopy ($RRR=0.52$, $p=0.010$) among never-recovered borderline patients compared to ever-recovered patients was not significant after Bonferroni correction. When all participants were considered together, the rates of CT scans, MRI scans, and colonoscopies increased significantly over time.

For example, as can be seen in Table 3, about 13% of ever-recovered patients and about 24% of never-recovered patients at 6-year follow-up reported having undergone a CT scan in the past two years. By the time of 16-year follow-up, these prevalence rates had increased to about 17% and 38%, respectively. The RRR of 0.54 for recovery status indicates that never-recovered borderline patients were almost twice as likely to undergo a CT scan as participants who had ever recovered from BPD ($1/0.54=1.85$).

Table 4 presents the rates of both outpatient care and financial challenges related to physical illness in ever-recovered and never-recovered borderline patients over a decade of prospective follow-up. Never-recovered borderline patients reported significantly lower rates of regular dental care than borderline patients who had ever recovered. Never-recovered borderline patients were also more likely than patients who had ever recovered to quit or lose their job due to poor health. There were no significant differences between ever-recovered and never-recovered borderline patients in the rates of primary care visits, specialist visits, annual physical exams, and difficulty accessing or paying for medical care. When all participants were considered together, the rate of specialist visits increased significantly over time.

DISCUSSION

This study is the first to examine the long-term longitudinal relationship of borderline personality disorder in well-diagnosed patients to chronic medical illness, poor health-related lifestyle choices, costly health care service utilization, and financial challenges related to medical illness. Our study contributes to the literature by reporting longitudinal differences in these medically-related variables based on recovery status among borderline patients over a decade of prospective follow-up, while controlling for potentially confounding effects of time-varying major depression.

We have reported four main findings. The first is that never-recovered borderline patients are significantly more likely than patients who ever recovered from BPD to suffer from chronic medical conditions over ten years of follow-up. This included a higher likelihood of poorly-defined medical syndromes, namely chronic fatigue, fibromyalgia, and TMJ, which was consistent on a longitudinal basis with our initial findings comparing non-remitted and remitted borderline patients at the beginning of our decade of prospective follow-up (Frankenburg & Zanarini, 2004). While chronic fatigue syndrome may be distinct from psychiatric illness, patients may perceive the syndrome, make attributions to it, and cope with it in ways that perpetuate its symptoms (Afari & Buchwald, 2003). Existing evidence suggests that patients with TMJ may have personalities that are more susceptible to life stresses and may express their anxiety in the form of this predictable physical syndrome (Southwell, Deary, & Geissler, 1990). Studies also suggest that patients may have a shared

susceptibility to both fibromyalgia and various psychiatric disorders (Arnold et al., 2006), possibly involving abnormal monoaminergic neurotransmitter function, or dysfunction of the anterior cingulate cortex resulting in dysregulation of both pain and emotion (Roy-Byrne, Smith, Goldberg, Afari, & Buchwald, 2004). These syndromes may in part be more prevalent among never-recovered borderline patients due to a more pronounced and/or enduring hyperbolic temperament that manifests as intense and chronic inner pain and the need for others to acknowledge it (Hopwood, Thomas, & Zanarini, 2012). This temperament may in turn combine with a defensive style characterized by emotional hypochondriasis (Zanarini, Frankenburg, & Fitzmaurice, 2013) to perpetuate the experience and clinical presentation of chronic fatigue, TMJ and fibromyalgia among never-recovered borderline patients.

As was the case with non-remitted borderline patients in our initial report, never-recovered borderline patients were also more likely to be obese or to suffer from the obesity-related medical illnesses of osteoarthritis, diabetes, and urinary incontinence over ten years of follow-up. This is consistent with our previous finding that increases in cumulative BMI over 10 years among borderline women were associated both with impaired psychosocial functioning (no life partner, poor work or school history, and lower GAF score) and having two or more other weight-related medical conditions (Frankenburg & Zanarini, 2011). In keeping with our expectations, several progressive medical conditions became more prevalent over time among all participants combined, particularly osteoarthritis, diabetes, hypertension, chronic back pain, and the presence of multiple medical conditions. Caution must be exercised, however, in interpreting these time trends, as it is not possible to discern the component of the trend due to the natural aging process from that due to BPD.

Thus there emerges a clear relationship between the inability to recover from borderline personality disorder over ten years and the presence of one or more chronic medical conditions. It is possible that an underlying biological vulnerability or lack of resiliency among certain patients may contribute both to greater difficulty recovering from borderline personality disorder and to a higher likelihood of developing chronic medical illness. On the other hand, medical illness may impede the ability of patients to recover from borderline personality disorder, and psychiatric impairment may, in turn, lead to poor health-related self-care that contributes to more physical illness (Frankenburg & Zanarini, 2004).

The second finding is that never-recovered borderline patients are more likely to make poor health-related lifestyle choices than patients who had recovered from BPD over ten years of follow-up. Similarly to our initial findings regarding non-remitted borderline patients (Frankenburg & Zanarini, 2004), never-recovered borderline patients continued to have higher rates of pack-per-day smoking, weekly alcohol consumption, no regular exercise, daily sleep medication use, overuse of pain medications, and multiple poor health-related lifestyle choices. It is possible that the higher prevalence of chronic medical illness among never-recovered patients may partially result from worse health-related lifestyle choices over time. Additionally, poor health-related self-care behaviors may perpetuate or amplify borderline personality symptomatology (Zanarini et al., 2004a) and interfere with vocational functioning, thereby decreasing the likelihood that borderline patients will recover. Given the volatile nature of substance use behaviors, we were not surprised to find relatively larger fluctuations during certain two-year follow-up intervals in the rates of alcohol use, sleep medication use, and overuse of pain medication. While it is concerning that regular alcohol use appears to increase over time for all participants considered together, we were heartened to see that regular exercise increased over 10 years of follow-up and that overuse of pain medications decreased during this time. Perhaps regular exercise in many of our study participants is helping to reduce pain over time and thereby obviating the need for pain medication overuse. We observed an increase in daily sleep medication use across all

participants, consistent with existing evidence of increased sleep medication use with older age (Omvik et al., 2010).

Our third finding is that never-recovered borderline patients are more likely to utilize costly medical services than patients who had recovered from BPD over a decade of prospective follow-up. A significantly higher percentage of never-recovered patients continued to have more medical ER visits, medical hospitalizations, or both over ten years, as we had observed with remitted borderline patients in our initial findings (Frankenburg & Zanarini, 2004). Our finding regarding increased utilization of radiological studies and procedures over a decade of follow-up among never-recovered borderline patients is new. It is striking that these patients have higher frequencies of x-rays, CT scans, and MRI scans than patients who had recovered from BPD.

To some extent it is expected and likely appropriate that never-recovered borderline patients would require higher utilization of expensive health care resources, given that we have found these patients to be more medically compromised than their counterparts who had recovered from BPD. This increased allocation of health care services to never-recovered patients, however, may also result from more frequent or persistent pursuit of health care services by these patients, who often lack close emotionally sustaining relationships in their personal life and may be seeking substitute interpersonal attachments from their clinicians. Never-recovered borderline patients may also exhibit an interpersonal style that leads physicians to order unnecessary and perhaps clinically inappropriate medical services in order to appease never-recovered patients and avoid prolonged or unpleasant conflicts with them.

The fourth finding is that never-recovered borderline patients experienced more financial challenges related to medical illness than patients who had recovered from BPD. Consistent with our initial findings (Frankenburg & Zanarini, 2004), never-recovered patients were more likely to quit or lose their job due to medical reasons over ten years of follow-up. This is not surprising since our operationalized definition of recovery requires patients to be able to go to work consistently, competently, and on a full-time basis. Our findings raise the possibility that the difficulty some never-recovered borderline patients have in maintaining employment may, in part, be due to compromised physical health, as opposed to stemming solely and directly from active borderline personality symptomatology, particularly as by the time of the 16-year follow-up, 99% had achieved a two-year symptomatic remission and 78% had achieved an eight-year symptomatic remission (Zanarini et al., 2012). As discussed in our previous report, the ramifications of losing a job due to illness are significant and can include financial problems, poor self-esteem, loss of daily structure, loss of health insurance, and strained relationships (Frankenburg & Zanarini, 2004). Our finding that never-recovered borderline patients are less likely to receive regular dental care may reflect yet another poor health-related lifestyle choice, or alternatively this may be a consequence of limited healthcare access and reflect the greater financial challenges faced by never-recovered patients. Thus failure to recover from borderline personality disorder is associated with an increased economic burden on both the health care system and the individual patient.

Limitations of this study include variable use of psychotropic and other medications by our patients (Horz, et al., 2010; Zanarini et al., 2004b), and the complicated effects these medications can have on physical health (Keck & McElroy, 2003). All of the patients were seriously ill inpatients at the start of the study. About 90% of them were in individual therapy and taking psychotropic medications at baseline and about 70% were participating in each of these outpatient modalities during each follow-up period (Horz et al., 2010). Thus, it is difficult to know if these results would generalize to a less impaired group of patients or people meeting criteria for BPD who were not in treatment. Our participants are

commonly treated with several medications at once, with the number being treated by polypharmacy remaining relatively stable over time: approximately 40% of borderline patients take three or more concurrent standing medications during each follow-up period, 20% take four or more, and 10% take five or more (Zanarini et al., 2004b). Moreover, 44% of borderline participants report discontinuing psychotropic medications at one or more follow-up over 10 years, and 67% of this subset of participants resume psychopharmacology during a subsequent two-year period (Horz et al., 2010). Thus the relationship between the effects of medication use and physical health cannot be reasonably assessed in this study.

Another limitation is our use of the participant as the sole historian, as opposed to obtaining information from a centralized electronic medical record system, which is often simply unavailable. Unfortunately, participants received medical care at many disparate facilities, making direct access to their various medical records impossible.

In conclusion, we have found that failure to recover from borderline personality disorder is related to chronic medical illness, poor self-care, greater utilization of health care resources, and more financial challenges related to illness over a decade of prospective follow-up, even when controlling for the potentially confounding effects of major depression. Mental health clinicians treating low-functioning borderline patients ought to pay close attention to their medical health. Mental health treaters are often the primary treaters involved in the care of these patients and should understand the interactions between their psychiatric illness and medical comorbidities. Attentively and judiciously caring for the physical health of borderline patients, with thoughtful utilization of medical services by physicians involved in their care, may help curb the progression of their chronic medical illness over time.

Future directions for research include investigating the longitudinal relationship of recovery from BPD to chronic medical illnesses that become more prevalent in later life, such as cancers and cardiovascular disease. Additionally, investigating the genetic underpinnings common to both chronic medical illness and failure to attain recovery from BPD may help elucidate fundamental biological vulnerabilities that predispose patients to an overall lack of resiliency and poor health outcomes.

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Table 1
Prevalence of Chronic Medical Conditions and Recovery Status in Borderline Patients over a Decade of Prospective Follow-up

	Patients Who Ever Recovered from BPD								Patients Who Never Recovered from BPD							
	6 Yr FU (N=148)	8 Yr FU (N=144)	10 Yr FU (N=142)	12 Yr FU (N=141)	14 Yr FU (N=138)	16 Yr FU (N=134)	6 Yr FU (N=116)	8 Yr FU (N=111)	10 Yr FU (N=107)	12 Yr FU (N=103)	14 Yr FU (N=100)	16 Yr FU (N=97)	RRR Group Time	95 % CI Group Time		
Syndrome	19.6 (N=29)	11.1 (N=16)	15.5 (N=22)	18.4 (N=26)	18.8 (N=26)	15.7 (N=21)	33.6 (N=39)	30.6 (N=34)	25.2 (N=27)	31.1 (N=32)	32.0 (N=32)	37.1 (N=36)	0.51** 1.10*	0.36, 0.73 0.90, 1.35		
Obesity (BMI ≥ 30 kg/m ²)	15.5 (N=23)	20.8 (N=30)	21.1 (N=30)	22.0 (N=31)	21.7 (N=30)	25.4 (N=34)	44.0 (N=51)	44.1 (N=49)	47.7 (N=51)	48.5 (N=50)	48.0 (N=48)	49.5 (N=48)	0.47** 1.18*	0.35, 0.65 1.01, 1.36		
Osteoarthritis	4.0 (N=6)	4.9 (N=7)	4.9 (N=7)	5.0 (N=7)	9.4 (N=13)	11.9 (N=16)	15.5 (N=18)	13.5 (N=15)	21.5 (N=23)	15.5 (N=16)	25.0 (N=25)	26.8 (N=26)	0.43** 2.22	0.26, 0.70 1.54, 3.21		
Diabetes	1.4 (N=2)	2.1 (N=3)	2.8 (N=4)	3.6 (N=5)	4.6 (N=6)	3.7 (N=5)	6.0 (N=7)	11.7 (N=13)	12.2 (N=13)	10.7 (N=11)	17.0 (N=17)	14.4 (N=14)	0.26** 2.11	0.11, 0.67 1.27, 3.50		
Hypertension	5.4 (N=8)	6.2 (N=9)	9.2 (N=13)	10.6 (N=15)	13.0 (N=18)	17.2 (N=23)	10.3 (N=12)	11.7 (N=13)	13.1 (N=14)	16.5 (N=17)	24.0 (N=24)	25.8 (N=25)	0.60* 2.84	0.38, 0.96 1.92, 4.20		
Chronic Back Pain	39.2 (N=58)	29.2 (N=42)	29.6 (N=42)	24.1 (N=34)	34.8 (N=48)	47.8 (N=64)	45.7 (N=53)	35.1 (N=39)	34.6 (N=37)	38.8 (N=40)	54.0 (N=54)	57.7 (N=56)	0.78* 1.40	0.63, 0.96 1.18, 1.65		
Urinary Incontinence	2.0 (N=3)	3.5 (N=5)	2.1 (N=3)	1.4 (N=2)	1.4 (N=2)	3.7 (N=5)	11.2 (N=13)	8.1 (N=9)	13.1 (N=14)	8.7 (N=9)	15.0 (N=15)	22.1 (N=21)	0.19** 1.98*	0.08, 0.36 1.16, 3.36		
Multiple medical conditions	19.6 (N=29)	15.3 (N=22)	22.5 (N=32)	20.6 (N=29)	28.3 (N=39)	35.1 (N=47)	44.0 (N=51)	38.7 (N=43)	49.5 (N=53)	47.6 (N=49)	60.0 (N=60)	61.9 (N=60)	0.49** 1.69	0.38, 0.62 1.42, 2.01		

* P-level results NS

** P-level results <0.0063

Abbreviation: BMI = body mass index

Poor Health-Related Lifestyle Choices and Recovery Status in Borderline Patients over a Decade of Prospective Follow-up

Table 2

	Patients Who Ever Recovered from BPD						Patients Who Never Recovered from BPD							
	6 Yr FU (N=148)	8 Yr FU (N=144)	10 Yr FU (N=142)	12 Yr FU (N=141)	14 Yr FU (N=138)	16 Yr FU (N=134)	6 Yr FU (N=116)	8 Yr FU (N=111)	10 Yr FU (N=107)	12 Yr FU (N=103)	14 Yr FU (N=100)	16 Yr FU (N=97)	RRR Group Time	95 % CI Group Time
Pack-per-day smoking	19.6 (N=29)	17.4 (N=25)	15.5 (N=22)	17.7 (N=25)	11.6 (N=16)	16.4 (N=22)	39.7 (N=46)	36.0 (N=40)	35.5 (N=38)	40.8 (N=42)	39.0 (N=39)	34.0 (N=33)	0.45** 0.88*	0.31, 0.64 0.72, 1.08
Weekly alcohol	34.5 (N=51)	11.8 (N=17)	23.2 (N=33)	47.5 (N=67)	52.2 (N=72)	47.8 (N=64)	23.3 (N=27)	12.6 (N=14)	13.1 (N=14)	25.2 (N=26)	22.0 (N=22)	21.6 (N=21)	2.03** 2.03**	1.48, 2.80 1.65, 2.50
Lack of regular exercise	41.9 (N=62)	42.4 (N=61)	36.6 (N=52)	31.2 (N=44)	31.2 (N=43)	28.4 (N=38)	65.5 (N=76)	73.0 (N=81)	57.9 (N=62)	56.3 (N=58)	50.0 (N=50)	55.7 (N=54)	0.63** 0.72**	0.53, 0.75 0.61, 0.85
Daily use of sleep Medication	22.3 (N=33)	14.6 (N=21)	11.3 (N=16)	19.2 (N=27)	24.6 (N=34)	23.9 (N=32)	43.1 (N=50)	29.7 (N=33)	25.2 (N=27)	35.9 (N=37)	38.0 (N=38)	51.6 (N=50)	0.57** 1.46**	0.45, 0.73 1.15, 1.86
Overuse of pain medication	27.0 (N=40)	15.3 (N=22)	23.9 (N=34)	4.3 (N=6)	7.2 (N=10)	11.2 (N=15)	33.6 (N=39)	30.6 (N=34)	41.1 (N=44)	14.6 (N=15)	14.0 (N=14)	22.7 (N=22)	0.60** 0.40**	0.46, 0.80 0.29, 0.54
Multiple poor health-related lifestyle choices	43.2 (N=64)	22.9 (N=33)	25.4 (N=36)	37.6 (N=53)	36.2 (N=50)	39.6 (N=53)	61.2 (N=71)	58.6 (N=65)	50.5 (N=54)	49.5 (N=51)	55.0 (N=55)	63.9 (N=62)	0.63** 1.06*	0.53, 0.75 0.90, 1.24

* P-level results NS

** P-level results <0.0083

Costly Medical Service Utilization and Recovery Status in Borderline Patients over a Decade of Prospective Follow-up

Table 3

	Patients Who Ever Recovered BPD						Patients Who Never Recovered from BPD							
	6 Yr FU (N=148)	8 Yr FU (N=144)	10 Yr FU (N=142)	12 Yr FU (N=141)	14 Yr FU (N=138)	16 Yr FU (N=134)	6 Yr FU (N=116)	8 Yr FU (N=111)	10 Yr FU (N=107)	12 Yr FU (N=103)	14 Yr FU (N=100)	16 Yr FU (N=97)	RRR Group Time	95 % CI Group Time
	ER Visits and Medical Hospitalizations													
Medical ER Visit	51.4 (N=76)	43.1 (N=62)	46.5 (N=66)	45.4 (N=64)	47.1 (N=65)	38.8 (N=52)	66.4 (N=77)	60.4 (N=67)	56.1 (N=60)	53.4 (N=55)	65.0 (N=65)	63.9 (N=62)	0.76** 0.92*	0.66, 0.87 0.81, 1.05
Medical hospitalization	16.2 (N=24)	22.2 (N=32)	14.8 (N=21)	14.9 (N=21)	22.5 (N=31)	17.2 (N=23)	37.9 (N=44)	34.2 (N=38)	30.8 (N=33)	36.9 (N=38)	35.0 (N=35)	40.2 (N=39)	0.52** 1.09*	0.40, 0.68 0.85, 1.40
Both ER visit and hospitalization	14.2 (N=21)	16.0 (N=23)	12.7 (N=18)	12.8 (N=18)	17.4 (N=24)	11.2 (N=15)	34.5 (N=40)	32.4 (N=36)	25.2 (N=27)	25.2 (N=26)	33.0 (N=33)	36.1 (N=35)	0.48** 1.00*	0.35, 0.65 0.75, 1.34
	Imaging Studies and Procedures													
X-ray	28.4 (N=42)	22.9 (N=33)	25.4 (N=36)	23.4 (N=33)	23.9 (N=33)	23.1 (N=31)	44.0 (N=51)	46.0 (N=51)	41.1 (N=44)	53.4 (N=55)	45.0 (N=45)	51.6 (N=50)	0.54** 1.05*	0.43, 0.68 0.87, 1.26
Ultrasound	29.7 (N=44)	33.3 (N=48)	30.3 (N=43)	27.7 (N=39)	37.0 (N=51)	29.8 (N=40)	37.1 (N=43)	29.7 (N=33)	29.9 (N=32)	33.0 (N=34)	36.0 (N=36)	41.2 (N=40)	0.93** 1.13*	0.74, 1.15 0.91, 1.41
CT scan	12.8 (N=19)	11.8 (N=17)	11.3 (N=16)	16.3 (N=23)	24.6 (N=34)	17.2 (N=23)	24.1 (N=28)	23.4 (N=26)	31.8 (N=34)	39.8 (N=41)	33.0 (N=33)	38.1 (N=37)	0.54** 1.71**	0.41, 0.72 1.30, 2.26
MRI scan	21.6 (N=32)	12.5 (N=18)	22.5 (N=32)	19.9 (N=28)	28.3 (N=39)	32.1 (N=43)	25.9 (N=30)	27.9 (N=31)	33.6 (N=36)	37.9 (N=39)	40.0 (N=40)	44.3 (N=43)	0.71** 1.84**	0.55, 0.91 1.44, 2.34
Colonoscopy	4.0 (N=6)	4.2 (N=6)	4.2 (N=6)	2.8 (N=4)	7.2 (N=10)	9.0 (N=12)	5.2 (N=6)	5.4 (N=6)	4.7 (N=5)	2.9 (N=3)	17.0 (N=17)	22.7 (N=22)	0.52* 4.41**	0.32, 0.86 2.40, 8.11

* P-level results NS

** P-level results <0.0063

Abbreviations: ER = emergency room, CT scan = computed tomography scan, MRI scan = magnetic resonance imaging scan

Rates of Outpatient Care, Problems Related to Accessing/Paying for Medical Care, Work-Related Negative Sequelae of Physical Illness and Recovery Status in Borderline Patients over a Decade of Prospective Follow-up

Table 4

	Patients Who Ever Recovered from BPD						Patients Who Never Recovered from BPD							
	6 Yr FU (N=148)	8 Yr FU (N=144)	10 Yr FU (N=142)	12 Yr FU (N=141)	14 Yr FU (N=138)	16 Yr FU (N=134)	6 Yr FU (N=116)	8 Yr FU (N=111)	10 Yr FU (N=107)	12 Yr FU (N=103)	14 Yr FU (N=100)	16 Yr FU (N=97)	RRR Group Time	95 % CI Group Time
	Outpatient Treatments													
Primary Care Physician Visit	86.5 (N=128)	83.3 (N=120)	88.7 (N=126)	89.4 (N=126)	88.4 (N=122)	91.0 (N=122)	91.4 (N=106)	91.0 (N=101)	89.7 (N=96)	95.2 (N=98)	92.0 (N=92)	93.8 (N=91)	0.96 [*] 1.04 [*]	0.91, 1.01 0.99, 1.09
Specialist Visit	41.9 (N=62)	48.6 (N=70)	56.3 (N=80)	60.3 (N=85)	68.1 (N=94)	65.7 (N=88)	56.0 (N=65)	54.0 (N=60)	57.9 (N=62)	73.8 (N=76)	65.0 (N=65)	79.4 (N=77)	0.91 [*] 1.53 ^{**}	0.81, 1.03 1.36, 1.74
Annual Physical	82.4 (N=122)	83.3 (N=120)	81.0 (N=115)	79.4 (N=112)	84.1 (N=116)	84.3 (N=113)	90.5 (N=105)	89.2 (N=99)	84.1 (N=90)	87.4 (N=90)	85.0 (N=90)	90.7 (N=85)	0.90 [*] 0.94 [*]	0.90, 1.02 0.94, 1.06
Regular Dental Care	79.0 (N=117)	74.3 (N=107)	66.9 (N=95)	73.9 (N=102)	74.6 (N=100)	74.6 (N=100)	66.4 (N=77)	55.0 (N=61)	51.4 (N=55)	41.8 (N=43)	53.0 (N=53)	53.6 (N=52)	1.37 ^{**} 0.91 [*]	1.20, 1.56 0.81, 1.02
Financial Challenges Related to Medical Illness														
Difficulty Accessing or Paying for Health Care ^a	20.3 (N=30)	12.5 (N=18)	9.9 (N=14)	11.4 (N=16)	9.4 (N=13)	10.4 (N=14)	23.3 (N=27)	11.7 (N=13)	12.2 (N=13)	12.6 (N=13)	15.0 (N=15)	25.8 (N=25)	0.77 [*] 0.77 [*]	0.53, 1.11 0.52, 1.14
Quit or Lost Job Due to Poor Health	1.4 (N=2)	2.1 (N=3)	0.7 (N=1)	1.4 (N=2)	2.9 (N=4)	2.2 (N=3)	13.8 (N=16)	7.2 (N=8)	0.9 (N=1)	6.8 (N=7)	7.0 (N=7)	9.3 (N=9)	0.26 ^{**} 0.89 [*]	0.14, 0.48 0.39, 2.03

* P-level results NS

** P-level results <0.0083

^aPut off seeing doctor because of insurance problems, unable to afford medical attention, and/or gone into debt because of medical illness.