



Early traumatic life events, parental attitudes, family history, and birth risk factors in patients with borderline personality disorder and healthy controls

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Abstract

Patients with borderline personality disorder (BPD) were not yet compared with a healthy control group with regard to traumatic life events during childhood. The patients ($n=66$) and controls ($n=109$) were investigated using a comprehensive retrospective interview with 203 questions about childhood traumatic life events, parental attitudes, family history of psychiatric disorders and birth risk factors. The frequency of reports of traumatic childhood experiences was significantly higher in patients than in controls, including sexual abuse, violence, separation from parents, childhood illness, and other factors. On a 0- to 10-point “severe trauma scale,” patients had significantly more severe traumatic events (mean score=3.86, SD=1.77) than control subjects (0.61, SD=0.93). Only four (6.1%) of the BPD patients, but 67 (61.5%) of the controls did not report any severe traumatic events at all. Compared with controls, patients described the attitude of their parents as significantly more unfavorable in all aspects. Patients reported significantly higher rates of psychiatric disorders in their families in general, especially anxiety disorders, depression, and suicidality. Among birth risk factors, premature birth was reported more often in BPD subjects. In a logistic regression model of all possible etiological factors examined, the following factors showed a significant influence: familial neurotic spectrum disorders, childhood sexual abuse, separation from parents and unfavorable parental rearing styles. The present data support the hypothesis that the etiology of BPD is multifactorial and that familial psychiatric disorders and sexual abuse are contributing factors.

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1. Introduction

Several studies have retrospectively investigated the history of developmental trauma in patients with borderline personality disorder (BPD). These studies compared patients with BPD with other psychiatric samples, e.g. with patients with depression (Ogata et al., 1990; Weaver and Clum, 1993), other personality disorders (Paris et al., 1994; Zanarini et al., 2000; Zweig-Frank et al., 1994), or mixed samples of psychiatric patients (Brown and Anderson, 1991; Herman et al., 1989; Ludolph et al., 1990; Soloff and Millward, 1983a; Spitzer et al., 2000; Yen et al., 2002). All of these studies, though not comparable because of the diverse control groups, consistently reported higher rates of childhood sexual abuse (especially incest), physical abuse, witnessing serious domestic violence, and emotional and physical neglect in BPD patients. This was also confirmed in subjects with “childhood BPD” (Goldman et al., 1992; Zerkowitz et al., 2001). In comparisons of various psychiatric disorders, BPD was the diagnosis most frequently associated with sexual abuse (Brown and Anderson, 1991; Sansone et al., 2002; Yen et al., 2002). Two studies with non-clinical subjects from representative surveys found that subjects who endorsed borderline features reported more childhood emotional, physical, and supervision neglect (Johnson et al., 2000; Trull, 2001).

To our knowledge, BPD patients have not yet been compared with a healthy control group with regard to childhood trauma. Although comparisons with other psychiatric disorders found a higher rate of environmental risk factors, these studies may have underestimated the relative association of these risk factors with BPD.

Family and twin studies also converge to support an underlying genetic component to the disorder. A number of studies investigating first degree relatives found higher rates of familiarity in BPD patients than in controls (Baron et al., 1985; Loranger et al., 1982; Silverman et al., 1991; Soloff and Millward, 1983b; Zanarini et al., 1988), while one study found only a trend towards familiarity (Reich, 1989) and another found an association only in patients with comorbid depression (Pope et al., 1983). Also, the offspring of borderline mothers are at high risk of psychopathology (Weiss et al., 1996).

Family studies do not disentangle genetic from environmental factors, as personality traits may also be transmitted via model learning (Bandura, 1971) or due to impaired parenting skills of parents with mood lability, impulsivity, or reality distortion. However, in a twin study with 221 pairs, the concordance for “definite” BPD was 35% in monozygotic and 7% in dizygotic pairs, suggesting a genetic component in BPD (Torgersen et al., 2000).

Finally, susceptibility to BPD might also be caused by fetal, perinatal or postnatal brain damage. Some studies have reported an association of BPD with organic brain lesions (Andrulonis et al., 1981, 1982; van Reekum et al., 1993), pregnancy complications (Soloff and Millward, 1983a) or childhood attention deficit/hyperactivity symptoms (Fossati et al., 2002). Neuropsychological deficits have been demonstrated in adults (Torgersen, 1984) and children (Zerkowitz et al., 2001) with BPD. Brain-imaging studies found abnormalities in BPD patients (de la Fuente et al., 1997; Driessen et al., 2000; Herpertz et al., 2001; Lyoo et al., 1998; Soloff et al., 2000). In a number of investigations, abnormalities of neurobiological parameters have been found in BPD, including dopamine, serotonin, norepinephrine, acetylcholine, monoamine oxidase, hypothalamic–pituitary–adrenal axis or thyrotropin releasing hormone activity (Ajamiéh and Ansseau, 2000; Korzekwa et al., 1993).

To our knowledge, the present study is the first comparison of patients with BPD and healthy control subjects with regard to childhood trauma, parental rearing styles, and familial psychiatric disorders in subject matched by age and sex.

2. Methods

Sixty-six outpatients with borderline personality disorder (DSM-IV) treated at the Department of Psychiatry and Psychotherapy at the University of Göttingen, the Landeskrankenhaus Göttingen, the Fachkrankenhaus für Psychiatrie und Neurologie Mühlhausen, and the Landeskrankenhaus Moringen, Germany were interviewed personally. Seven patients refused to take part in the study. Diagnoses were confirmed using the SCID (Structured Clinical Interview for DSM-IV; Wittchen et al., 1997), the German Version of the SCID I/II (First et al., 1996, 1997).

Exclusion criteria were severe current medical illness and a history or a current episode of schizophrenia or bipolar disorder.

Out of a pool of 155 healthy controls recruited for an earlier study, 109 subjects who were free of psychiatric disorders according to the SCID were chosen in order to match patients and control subjects for age and sex. Controls were recruited from visitors to official buildings (e.g. hospitals and city halls). The mean age of patients was 30.2 (SD 9.4), the mean age of controls 32.3 (SD 6.6); the difference was not significant (*t*-test, $t=1.57$, N.S.). The percentage of women was 71.2% in the patient group and 60.6% in the control group; the difference was not statistically significant ($\chi^2=2.04$, $P=0.19$).

The study was approved by the local ethics committee. After giving informed consent, subjects were interviewed personally or by telephone, using a standardized questionnaire with 203 questions already used in an earlier study with panic disorder patients (Bandelow et al., 2002). Four types of questions were posed: questions to be answered (1) by 'yes' or 'no'; (2) on a 0- to 4-point Likert scale, where 0='none' or 'very bad', 1='low' or 'bad', 2='moderate', 3='high' or 'good', and 4='very high' or 'very good'; (3) by a number (e.g., months of hospitalization); and (4) in the subject's own words. The questionnaire contained items concerning (1) traumatic life events during childhood from the ages of 0–5, 6–10, and 11–15 (Table 1), (2) parental attitudes towards the subjects (Table 2), (3) psychiatric disorders in family members (Table 3), and (4) birth risk factors. Birth risk factors included age of mother >35, Caesarean section, low birth weight, premature birth, or perinatal complications (e.g. asphyxia). Patients were asked to describe psychiatric disorders in first degree relatives as exactly as possible so that the interviewer could establish the diagnosis.

To determine whether not only single events, but rather a combination of multiple severe traumatic life events was associated with BPD, scoring was listed on the following 0- to 10-point "severe trauma scale", with each of the items below receiving one point:

- separation from the natural mother, due to death of mother, long absence of the mother due to illness (>100 days), adoption, upbringing in a foster

home, upbringing by other family kin or unrelated persons, or long absence due to divorce or separation of parents;

- separation from the natural father, due to death of the father, long absence of the father due to illness (>100 days), adoption, upbringing in a foster home, upbringing by other family members or unrelated persons, long absence of the father due to war service or war imprisonment, absence due to separation or divorce of parents, or absence due to imprisonment;
- separation from parents due to illness of the proband (>100 days);
- severe physical handicap of the subject during childhood;
- severe physical handicap of sibling;
- parents' marital problems, degree 3 or 4 on a 0–4 scale
- alcohol addiction of one or both parents, degree 3 or 4 on a 0–4 scale;
- severe psychiatric illness of mother or father (other than alcohol dependence), degree 3 or 4 on a 0- to 4-point scale;
- violence in the family, degree 3 or 4 on a 0- to 4-point scale;
- sexual molestation or abuse.

To determine which possible etiological factors were most strongly associated with borderline personality, logistic regression was performed. Logistic regression analysis is often used to investigate the relationship between a criterion and a set of ordinal explanatory variables. It can identify events that are directly associated with the criterion, i.e. being a member of the BPD or the control group, and to filter out events that are only indirectly associated via latent variables, as many complex intercorrelations may exist among the items investigated. Based on assumptions in the literature, the degree to which the following seven factors may contribute to the development of BPD was analyzed:

- separation from one or both parents (as defined above);
- childhood sexual abuse;
- alcoholism of one or both parents;
- violence in family;
- birth risk factors;

Table 1

Traumatic life events during childhood, significant differences between borderline patients ($n=66$) and control subjects ($n=109$) (due to missing values, percentages represent the proportion of all respondents and not of the total sample)

| Item | Mean/CT (SD), or n (%) | | Statistic | P |
|--|--------------------------|----------------|----------------|---------|
| | Patients | Controls | | |
| <i>Separation from mother</i> | | | | |
| Mother hospitalized, n (%) | 42 (65.6%) | 38 (34.9%) | $\chi^2=15.35$ | <0.0001 |
| Child's age at time of a major hospitalization of mother (in months) | 56.1 (SD 58.4) | 18.0 (SD 36.3) | $U=997$ | 0.005* |
| Duration of mother's hospitalization in days | 275.8 (768.8) | 7.3 (SD 22.3) | $U=3023$ | 0.04* |
| <i>Separation from father</i> | | | | |
| Father frequently absent, degree, 0–4, CT | 2.0 (SD 1.3) | 0.5 (SD 0.5) | $U=2888$ | <0.0001 |
| Father in jail, n (%) | 16 (24.2%) | 0 (0%) | $\chi^2=29.1$ | <0.0001 |
| Father frequently absent, other reasons | 27 (79.4%) | 10 (9.2%) | $\chi^2=66.7$ | <0.0001 |
| <i>Separation from both natural parents</i> | | | | |
| Foster home, n (%) | 16 (24.2%) | 0 (0%) | $\chi^2=29.1$ | <0.0001 |
| Adopted child or foster-child, n (%) | 6 (9.0%) | 1 (0.9%) | $\chi^2=7.2$ | 0.012* |
| Child was mostly reared by other persons, e.g. aunt, grandparents, n (%) | 32 (48.5%) | 5 (4.6%) | $\chi^2=47.5$ | <0.0001 |
| <i>Parents' marital problems, separation, divorce</i> | | | | |
| Marital problems, 0–4, CT | 3.10 (SD 1.32) | 1.07 (SD 1.28) | $U=1069$ | <0.0001 |
| Parents' separation, n (%) | 19 (29.2%) | 9 (8.3%) | $\chi^2=13.3$ | 0.0003 |
| Divorce of parents, n (%) | 16 (25.0%) | 8 (7.4%) | $\chi^2=10.4$ | 0.0024* |
| <i>Siblings</i> | | | | |
| Prolonged illness of sibling, n (%) | 15 (28.3%) | 13 (12.0%) | $\chi^2=6.7$ | 0.0097* |
| Severity of illness of sibling, 0–4, CT | 0.74 (SD 1.42) | 1.58 (SD 1.12) | $U=2258$ | <0.0001 |
| <i>Childhood illness</i> | | | | |
| Major illness in childhood | 4 (6.1%) | 2 (1.8%) | $\chi^2=17.8$ | <0.0001 |
| Duration of illness in months | 144.4 (SD 682.2) | 12.5 (SD 25.5) | $U=2334$ | 0.0001 |
| Hospitalization of child | 48 (72.7%) | 41 (37.6%) | $\chi^2=20.3$ | <0.0001 |
| Duration of hospitalization | 27.8 (SD 41.1) | 9.5 (SD 20.7) | $U=2186$ | <0.0001 |
| <i>Handicaps</i> | | | | |
| Subject handicapped, n (%) | 11 (16.7%) | 0 (0%) | $\chi^2=19.4$ | <0.0001 |
| One of the siblings handicapped, n (%) | 8 (12.1%) | 1 (0.9%) | $\chi^2=10.6$ | 0.019* |
| <i>Social situation</i> | | | | |
| Unemployment of mother, n (%) | 28 (42.4%) | 18 (16.5%) | $\chi^2=14.24$ | 0.0003 |
| Mother working as a prostitute | 4 (6.6%) | 0 (0%) | $\chi^2=6.76$ | 0.019* |
| <i>Violence in the family</i> | | | | |
| Violence by any family member, n (%) | 36 (54.6%) | 3 (2.8%) | $\chi^2=63.7$ | <0.0001 |
| Father beats child, n (%) | 38 (57.6%) | 38 (34.9%) | $\chi^2=8.6$ | 0.0033 |
| Degree of violence by father against children, 0–4, CT | 1.44 (SD1.56) | 0.54 (SD 0.80) | $U=2450$ | 0.0004 |
| Father beats mother, n (%) | 18 (27.3%) | 2 (1.8%) | $\chi^2=26.3$ | <0.0001 |
| Degree of violence by father against mother, 0–4, CT | 0.64 (SD 1.27) | 0.03 (SD 0.21) | $U=2678$ | 0.005* |
| Mother beats child, n (%) | 42 (63.6%) | 47 (43.1%) | $\chi^2=6.9$ | 0.0085* |
| Degree of violence by mother against children, 0–4, CT | 1.38 (SD1.37) | 0.50 (SD 0.63) | $U=2333$ | 0.0001 |
| <i>Sexual abuse</i> | | | | |
| Intrusion of personal space by adult (non-genital), n (%) | 48 (73.9%) | 6 (5.5%) | $\chi^2=88.9$ | <0.0001 |
| Sexual abuse (genital) | 38 (60.3%) | 2 (2.3%) | $\chi^2=64.1$ | <0.0001 |

Table 1 (continued)

| Item | Mean/CT (SD), or <i>n</i> (%) | | Statistic | <i>P</i> |
|---|-------------------------------|----------------|----------------|----------|
| | Patients | Controls | | |
| <i>Sexual abuse (continued)</i> | | | | |
| Total duration of sexual abuse period (in months) | 40.7 (SD 58.9) | 0.03 (SD 0.09) | <i>U</i> =1348 | <0.0001 |
| Perpetrator intrafamilial (father, uncle, grandfather, brother, mother) | 20 (30.3%) | 0 (0%) | $\chi^2=37.3$ | <0.0001 |
| Perpetrator extrafamilial, acquainted | 19 (28.8) | 0 (0%) | $\chi^2=35.2$ | <0.0001 |

N=number; 0–4=0- to 4-point Likert scale; CT=central tendency; SD=standard deviation; χ^2 =chi-squared (Fisher's exact test); *U*=statistic for Wilcoxon–Mann–Whitney test; *P*=probability score; *=not significant after Bonferroni correction.

- unfavorable parental attitude;
- family history of neurotic spectrum disorders (first degree relatives).

Neurotic spectrum disorders included panic disorder, generalized anxiety disorder, and borderline personality disorder.

Statistical calculations were done using the SAS 8.2 (SAS® Institute, Heidelberg, 2001). Categorical data comparisons were made using Fisher's exact test, ordinal data were analyzed using the Wilcoxon–Mann–Whitney test, and normally distributed data were assessed using Student's *t*-test after applying a test for homogeneity of variance (Folded F method). Two-tailed statistical tests were used throughout. Logistic regression was performed using the PROC LOGISTIC procedure of SAS 8.2. For better clarity, also for ordinal data, the central tendencies, i.e.

means, and standard deviations are shown in the tables.

In the case of multiple statistical testing, a Bonferroni correction was applied. In order not to further increase the number of statistical tests, results were not calculated separately for women and men, with the exception of data on sexual abuse.

3. Results

3.1. Traumatic childhood events

3.1.1. Separation from mother during childhood

The significant differences between the reports of BPD patients and controls are presented in Table 1. Some of these findings lost statistical significance after application of the Bonferroni correction.

Table 2

Reports on parental attitudes (0–4 Likert scale)

| Item | Central tendency (SD) | | <i>U</i> | <i>P</i> |
|--|-----------------------|----------------|----------|----------|
| | Patients | Controls | | |
| Punishment by parents, global impression | 3.20 (SD 1.17) | 1.47 (SD 0.91) | 977 | <0.0001 |
| Punishment by parents, frequency | 2.32 (SD 1.60) | 0.87 (SD 1.04) | 1782 | <0.0001 |
| Punishment by parents inappropriate | 2.34 (SD 1.65) | 0.87 (SD 1.04) | 1785 | <0.0001 |
| Mother strict | 2.21 (SD 1.34) | 1.40 (SD 1.02) | 2378 | 0.0002 |
| Mother short-tempered | 1.48 (SD 1.83) | 0.83 (SD 0.99) | 2737 | 0.008* |
| Restriction of autonomy by mother | 2.34 (SD 1.56) | 1.20 (SD 1.30) | 2105 | <0.0001 |
| Mother had a weak character | 2.20 (SD 1.70) | 1.51 (SD 1.36) | 1590 | <0.0001 |
| Sufficient love and care by mother | 1.47 (SD 0.79) | 3.17 (SD 1.41) | 1288 | <0.0001 |
| Father strict | 2.35 (SD 1.58) | 1.50 (SD 1.24) | 2446 | 0.0004 |
| Father short-tempered | 2.12 (SD 1.76) | 0.99 (SD 1.14) | 2342 | 0.0001 |
| Father dominant | 2.72 (SD 1.70) | 1.51 (SD 1.36) | 2604 | 0.002 |
| Restriction of autonomy by father | 1.95 (SD 1.67) | 1.04 (SD 1.13) | 2520 | 0.0009 |
| Father had a weak character | 2.21 (SD 1.48) | 0.86 (SD 1.09) | 1784 | <0.0001 |
| Sufficient love and care by father | 1.30 (SD 1.05) | 2.74 (SD 1.44) | 1667 | <0.0001 |
| Sufficient love and care by other close relative or care-giver | 1.40 (SD 1.36) | 2.15 (SD 1.45) | 2548 | 0.001 |

SD=standard deviation; *U*=statistic for Wilcoxon–Mann–Whitney test; *P*=probability value; *=not significant after Bonferroni correction.

Table 3

Reports on family history of psychiatric disorders: significant differences between borderline patients and controls

| Item | Mean/CT (SD), or <i>N</i> (%) | | Statistic | <i>P</i> |
|---|-------------------------------|----------------|----------------|----------|
| | Patients | Controls | | |
| <i>Family history of psychiatric disorders</i> | | | | |
| Any psychiatric disorder in family, <i>n</i> (%) | 48 (72.7%) | 14 (12.9%) | $\chi^2=64.4$ | <0.0001 |
| First degree relatives with panic disorder, <i>n</i> (%) | 19 (28.8%) | 1 (0.9%) | $\chi^2=31.55$ | <0.0001 |
| First degree relatives with generalized anxiety disorder, <i>n</i> (%) | 30 (45.5%) | 2 (1.8%) | $\chi^2=52.3$ | <0.0001 |
| First degree relatives with severe other neurotic disorder, <i>n</i> (%) | 22 (33.3%) | 1 (0.9%) | $\chi^2=37.8$ | <0.0001 |
| First degree relatives with borderline personality disorder, <i>n</i> (%) | 6 (9.1%) | 0 (0%) | $\chi^2=10.3$ | 0.0025 |
| First degree relatives with depression, <i>n</i> (%) | 41 (62.1%) | 11 (10.1%) | $\chi^2=53.3$ | <0.0001 |
| First degree relatives with schizophrenia, <i>n</i> (%) | 5 (7.6%) | 1 (0.9%) | $\chi^2=5.5$ | 0.03* |
| First degree relatives with other psychiatric disorders, <i>n</i> (%) | 22 (33.3%) | 4 (3.7%) | $\chi^2=28.6$ | <0.0001 |
| First degree relatives with suicidality, <i>n</i> (%) | 24 (36.4%) | 7 (6.4%) | $\chi^2=25.3$ | <0.0001 |
| First degree relatives, suicide attempts | 12 (18.2%) | 3 (2.8%) | $\chi^2=12.5$ | 0.0012 |
| <i>Alcohol abuse in family</i> | | | | |
| Degree of alcohol abuse, father, 0–4, CT, <i>n</i> (%) | 2.13 (SD 1.64) | 1.20 (SD 1.06) | <i>U</i> =3093 | 0.0031 |

N=number; CT=central tendency; SD=standard deviation; χ^2 =chi-squared (Fisher's exact test); *U*=statistic for Wilcoxon–Mann–Whitney test; *P*=probability score. Not significant after Bonferroni correction.

In the patient group, hospitalization of the mother during childhood was significantly more frequent. The mean age of the child at the beginning of a lengthy hospitalization of the mother and the duration of hospitalization were higher than in the control group, but these differences were not significant after correction for multiple testing. No significant differences between patients and controls were found with regard to the percentage of probands who lost their mother during childhood, the age at death of the mother in months, the age at first contact with the stepmother in months in those cases in which the subject's father remarried after the death of the mother or a divorce, the quality of the relationship with the stepmother (0–4 scale), and the percentage of probands whose mother was hospitalized during their childhood.

3.1.2. Separation from father during childhood

The absence of the father was rated more often on a 0–4 scale by the BPD subjects (Table 1). In 24.4%, the fathers of BPD subjects were imprisoned at some time during the observation period, but none of the fathers of control subjects were in jail. Absence due to war service (e.g. World War II, war in Yugoslavia) was not significantly different. Absence for other reasons was more frequent in the patient group.

No significant differences were found with regard to death of the father, the percentage of probands who

had a stepfather, age at first contact with the stepfather in months, relationship to the stepfather (0–4 scale), frequency of hospitalization of the father, age at time of a major hospitalization in months, and duration of hospitalizations in days.

3.1.3. Separation from both parents

Significantly more patients than controls reported that they were brought up by persons other than their own parents (e.g. aunts or grandparents) or had grown up in a foster home (Table 1). More children had been adopted in the borderline group, but this difference was not significant.

3.1.4. Parents' marital problems, separation, or divorce

Patients reported significantly more often that their parents had had marital discord or separations (Table 1). Divorces were more frequent in the borderline group (not significant).

3.1.5. Siblings

The groups did differ significantly with regard to prolonged illness of a sibling (Table 1). However, the severity of the illnesses of siblings was rated as more severe in the control group. The number of siblings did not differ between the groups. The number of siblings who died during the proband's childhood was equal in both groups.

3.1.6. *Childhood illness*

More patients than controls reported a major illness during childhood, and the duration of illness was significantly higher in the patient group. Also more and longer hospitalizations were reported in the BPD group (Table 1). None of these hospitalizations were due to psychiatric illness. The severity and age at onset of illness was not different.

3.1.7. *Physical handicaps*

More patients than controls reported that they were physically handicapped. Eight siblings in the patient group and only one in the control group had lived with physical handicaps (Table 1). The number of handicapped parents and the severity of parent's handicap did not differ.

3.1.8. *Social environment*

There was only a trend towards a higher average social class (on 0- to 4-point scale) in the control group (central tendency 2.32, SD 0.68) than in the patient group (2.05, SD=0.92, $U=4223$, $P=0.051$). In the patient group, there was a higher rate of unemployment of the mother (Table 1). The rate of unemployment of the father did not differ. Four subjects in the BPD and none in the control group reported that their mother had worked as a prostitute (not significant).

3.1.9. *Violence in families*

In general, violence was reported significantly more often in the patients' families. According to the subjects' reports, more fathers in the patient group beat their children, and the degree of violence was rated higher (Table 1). Also, in the patients' families, more violence of the father against the mother was reported (not significant after correction). Reports on violence of the mother against the father were not different; neither were statements on violence used by the siblings or other relatives.

3.1.10. *Sexual abuse*

A high percentage of BPD patients reported that they had been sexually molested or abused during their childhood. Childhood sexual abuse (CSA) with or without penetration was significantly more frequent in the BPD group than in the control group. The mean age at onset of the abuse was 72.0 months (SD=53.0).

The perpetrator was a relative (father, uncle, brother, grandfather, or mother) in 30.3%, an acquainted person in 28.8%, and a stranger in 13.6% of all BPD cases. CSA by strangers was not more frequent than in control persons (Table 1). The percentage of non-genital CSA was almost the same in men and women (73.7% and 73.9%, respectively).

CSA with penetration was numerically more frequent in women than in men (66.7% vs. 44.0%); however, the difference was not statistically significant. CSA by intrafamilial and acquainted perpetrators was not different between men and women, whereas CSA by strangers occurred in 19.1% of the women and none in men ($\chi^2=4.2$, $P=0.05$). Only two patients with CSA reported that they had received emotional support from one parent (e.g. the mother) in the context of the incidents.

3.2. *Age period*

A separate evaluation of traumatic events relevant during the three age periods (0–5, 6–10, and 11–15 years) did not reveal any patterns in the direction that events at a certain age period (e.g. 0–5 years) were more likely to distinguish between patients and controls. Due to the confines of space, the results for the three age periods are not presented separately.

3.3. *Parental attitude and rearing styles*

With one exception, all questions regarding parental attitude and rearing styles demonstrated more inappropriate rearing styles and less care and affection received from their parents, according to the reports of BPD patients (Table 2).

3.4. *Psychiatric disorders in the family*

BPD subjects reported a wide range of psychiatric morbidity in their first degree relatives. Anxiety disorders, depression, and suicidality in first degree relatives showed the largest differences from the control group (Table 3). Six BPD patients and none of the controls explicitly reported that their relatives had "borderline" disorder. The higher rate of schizophrenia in the first degree relatives reported by the patients was not statistically significantly.

The degree of alcohol abuse by the father was higher in the families of BPD patients, whereas no differences were found for the degree of alcohol abuse of the mother, or the percentage of moderate to severe alcohol abuse of mothers or fathers or of both parents.

3.5. Birth risk factors

Premature birth was reported by more BPD patients (14; 21.5%) than controls (10; 9.2%, $\chi^2=5.2$, $P=0.02$). There were no significant differences between the two groups regarding other birth risk factors including age of mother or father over 35 years at childbirth, low birth weight, Caesarean section, or perinatal complications.

A birth risk factor was reported in 29 (44.0%) of the patients and 33 (30.3%) of the controls. There was only a trend towards statistical significance ($P=0.067$).

3.6. Multiple traumatisation

On the 0–10-point “severe trauma scale” patients had a mean score of 3.86 (SD 1.77, range 0–8), which was significantly higher than in the control group (0.61, SD=0.93, range=0–4; Mann–Whitney $U=8883$, $P<0.0001$). Only four (6.1%) of the BPD patients, but 67 (61.5%) of the controls, reported no severe traumatic events ($\chi^2=93.2$, $P<0.0001$). The reliability (internal consistency; Cronbach’s α) of the “severe trauma scale” was found to be 0.76.

Table 4
Logistic regression: factors associated with borderline personality disorder

| Variable | Odds ratio | Confidence interval | <i>P</i> |
|--|------------|---------------------|-------------|
| First degree relatives with neurotic spectrum disorder | 22.00 | 2.5–196.03 | 0.0056 |
| Childhood sexual abuse | 17.63 | 4.49–69.26 | <0.0001 |
| Separation from parents | 3.52 | 1.49–8.33 | 0.0042 |
| Unfavorable parental attitudes | 1.12 | 1.01–1.21 | 0.014 |
| Violence in family | 4.54 | 0.55–37.69 | 0.16 (N.S.) |
| Birth risk factors | 1.23 | 0.60–2.53 | 0.58 (N.S.) |
| Alcoholism, parents | 0.89 | 0.11–7.23 | 0.91 (N.S.) |

P=probability value; N.S.=not significant.

3.7. Logistic regression

In the logistic regression model (Table 4), of all risk factors examined, the highest odds ratio was found for familial neurotic spectrum disorders, followed by childhood sexual abuse and separation from one or both parents. Unfavorable parental attitudes also had a statistically significant influence; however, their contribution was relatively small. Alcoholism of parents, violence in the family, and birth risk factors did not contribute significantly.

4. Discussion

To our knowledge the present study represents the first comparison of borderline patients and healthy control subjects regarding childhood traumatic life events, parental rearing styles and attitudes, familial factors and birth risk factors. Comparisons with other psychiatric disorders may underestimate the association of these risk factors with BPD. Also, the contrast with a healthy control group allows assessment of the relative contribution of the various risks to the disorder by using logistic regression.

The study confirmed the association of BPD with grossly deranged family environments, characterized by separation from parents, growing up in foster homes, adoption, criminality or violence in the family, inappropriate parental rearing styles, and lack of loving care that had already been reported in previous comparisons with other clinical samples. One of the most alarming findings of this study was the high incidence of childhood sexual abuse (CSA) reported in the patient group, confirming the results of all other related studies. Female and male patients were victims of CSA, as was shown in previous studies with pure female (Ludolph et al., 1990), pure male (Paris et al., 1994; Timmerman and Emmelkamp, 2001) or mixed samples (Herman et al., 1989; Ogata et al., 1990). The high rates of sexual traumatisation has led to discussions of whether BPD represents a form of posttraumatic stress disorder (Gunderson and Sabo, 1993).

However, the validity of the data depends on accurate reporting of events many years in the past. The interview method used in this survey may have led to a possible underreporting of sexual abuse (Dill

et al., 1991). There is the possibility that CSA was not reported due to repression (banishing unacceptable thoughts from consciousness). However, clinical observations showed that repression of traumatic events appears to be the exception rather than the rule (Loftus, 1993; Paris, 1995). On the other hand, it cannot be excluded that borderline patients may confabulate abuse histories or exaggerate certain events. “Splitting” (perceiving others as all good or all bad) may make a borderline patient more likely to see the family as malignant or abusive. In some cases, false abuse memories may have emerged in psychotherapy (Frankel, 1993). However, false memories are an unlikely explanation for the high frequency of trauma histories found in this and all other studies (Ferguson, 1997; Paris, 1995).

Not only adverse environments, but also familial factors were associated with BPD according to our data. According to the logistic regression, having a first degree relative with a psychiatric disorder from the neurotic spectrum was identified as the most important risk factor for BPD. However, this study was not conducted by interviewing the families directly, which also applies for most previous family studies, with only three exceptions (Baron et al., 1985; Links et al., 1988; Reich, 1989). This method may overestimate familial factors, as Links et al. (1988) found a frequency of only 3.4% of BPD in the family when the relatives were interviewed, but 15.1% based on information from the patient, suggesting that BPD probands exaggerate borderline features among their relatives, probably because they tend to have a negative view of their parents. In contrast, Andreasen et al. (1977) examined the family history versus the family study method and found an underreporting of psychiatric illnesses when patients with various diagnoses were asked about their relatives.

It is also questionable whether the subjects were fully informed about their relatives' psychiatric problems, and how reliable the interviewers' classifications of the family members' psychiatric disorders were on the basis of the patients' reports. Diagnosing BPD is sometimes difficult even for experts. Thus, it seems almost impossible to obtain exact information on familial transmission of borderline traits without interviewing the relatives directly.

Complex interdependencies exist among the various risk factors. A relationship between risk factors

and outcomes does not prove causation because they can sometimes be explained by latent (or moderator) variables. The logistic regression method may be able to identify the “true” contribution of a certain risk factor to a certain outcome. In our logistic regression model, familial neurotic spectrum disorders were identified as the most relevant risk factor, followed by childhood sexual abuse. Frequent separations from parents contributed to a lesser degree, but still substantially. Parental rearing styles were significantly associated with the BPD diagnosis; however, the degree of this influence was negligible.

Although the increased incidence of premature birth and a trend towards more overall birth risk factors was found in BPD patients, birth risk factors did not seem to play a significant role according to the logistic regression. Similarly, more familial violence and alcoholism were reported by BPD patients, but the contributions of these factors were not statistically significant in the logistic regression.

According to the psychoanalytic literature, traumatic events at the age of 0–5 were more important than events occurring in later life (Freud, 1910). In particular, BPD was seen as a disorder caused by traumatisations very early in life. However, in the present study, there was no evidence of a particular importance of a certain age period within the range of 0–15 years.

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