



Mentalization-based treatment or psychodynamic treatment programmes for patients with borderline personality disorder – the impact of clinical severity

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Objectives. Mentalization-based treatment (MBT), originally designed for patients with borderline personality disorder (BPD), may be particularly indicated for severe conditions. However, there is limited documentation of how increasing severity of personality disorder (PD) effect outcomes of highly specialized treatments. This study aimed to investigate associations between clinical severity and outcomes for patients in MBT as compared to a psychodynamic group-based treatment programme (PDT).

Design. A naturalistic, longitudinal, comparison study.

Methods. The sample included 345 patients with BPD (PDT $n = 281$, MBT $n = 64$). The number of diagnosed PDs, PD criteria, and symptom disorders were chosen as baseline indicators of clinical severity. Clinical outcomes (global functioning, symptom distress, interpersonal problems) were repeatedly assessed over three years. Therapists' fidelity to MBT was satisfactory. Linear mixed models were the applied statistics.

Results. In PDT, greater clinical severity was associated with poorer improvement rates. Clinical severity was not associated with significant differences in outcomes for patients in MBT. Differences in outcomes for patients in MBT and PDT increased significantly with higher severity of disorder.

Conclusions. Supporting previous research, this study indicates that clinical benefits associated with MBT also apply for BPD patients with severe conditions. The results also suggest that increasing severity was a challenge in PDT.

Practitioner points

- MBT may be particularly beneficial for severely disordered BPD patients
- Differences between MBT and PDT were less pronounced in moderately disordered BPD patients.

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Borderline personality disorder (BPD) is known to be a heterogeneous disorder of variable clinical severity (Johansen, Karterud, Pedersen, Gude, & Falkum, 2004). Patients with BPD typically present with characteristic interpersonal vulnerability, emotional instability, and a disturbed capacity to interpret and reflect over mental states (mentalization) (Antonsen, Johansen, Ro, Kvarstein, & Wilberg, 2016; Diamond *et al.*, 2014; Vaskinn *et al.*, 2015). Several studies have shown that the extent of maladaptive personality features, not only within BPD, but also across personality disorder (PD) categories, is closely related to the severity of social impairment and symptom distress among patients (Dimaggio, Carcione, *et al.*, 2013; Kvarstein & Karterud, 2012, 2013; Newton-Howes, Tyrer, & Weaver, 2008; Yang, Coid, & Tyrer, 2010). High comorbidity of symptom disorders may also indicate more severe personality pathology (Zanarini, Frankenburg, Hennen, *et al.*, 2004; Zimmerman *et al.*, 2012). Patients with BPD can be extensive users of health services (Bode, Vogel, Walker, & Kroger, 2016; Frankenburg & Zanarini, 2004). However, health service reports also include poor compliance, treatment drop-out, and repeated experiences of treatment failures (Barnicot, Katsakou, Marougka, & Priebe, 2011; Kvarstein & Karterud, 2013; Kvarstein, Karterud, & Pedersen, 2004; Kvarstein, Nordviste, Dragland, & Wilberg, 2016). Such treatment irregularity is likely to be linked to core BPD pathology (Hummelen, Wilberg, & Karterud, 2007). Severe relational problems combined with emotional dysregulation and risk prone behaviours represent considerable challenges for both patient and health services. These are essential arguments for the development and implementation of treatments specifically addressing BPD (Barnicot *et al.*, 2012; Paris, 2010).

Mentalization-based treatment (MBT) is one of several treatments specifically designed for BPD (Stoffers *et al.*, 2012). It is a long-term treatment, psychodynamically oriented, but highly structured, involving a combination of individual and group therapy and psychoeducation (Bateman & Fonagy, 2006). By style of intervention, MBT therapists explicitly seek to improve patients' capacity for mentalization. Treatment includes a mentalization-based case formulation (Simonsen, Nørgaard, Larsen, & Bjørnholm, 2011), individually formulated crisis plans, involves team cooperation and regular supervision, and is usually delivered in an intensive, outpatient format.

Positive outcomes of MBT have been documented in randomized controlled trials (RCT) and include symptom reduction (Bateman & Fonagy, 2001, 2009; Rossouw & Fonagy, 2012), reduced use of emergency and inpatient services (Bateman & Fonagy, 2003), and sustained long-term effects (Bateman & Fonagy, 2008). The promising results have been supported in naturalistic comparison studies (Bales *et al.*, 2015; Kvarstein *et al.*, 2014). The initial MBT day hospital study (Bateman & Fonagy, 2001) recruited poorly functioning patients with high levels of social impairment, extensive health service use, considerable comorbidity of PDs and symptom disorders, and severe symptoms (transient psychotic episodes, self-harming, suicide attempts). Patients in this study were generally more impaired than patients included in studies of other psychodynamic treatment programmes in the same period (Chiesa, Bateman, Wilberg, & Friis, 2002; Kvarstein *et al.*, 2004). A more recent investigation (based on an RCT of outpatient MBT) suggested differences in the effects of MBT and an alternative, control treatment (structured clinical management) depending on the severity of the disorder (Bateman & Fonagy, 2013). Clinical severity was operationalized as the number of diagnosed PDs, BPD criteria, comorbid symptom disorders, or symptom distress. MBT benefits were considerable for BPD patients with several comorbid PDs, but structured clinical management and MBT were equally effective for BPD patients with no other comorbidity.

The authors concluded that more severe BPD conditions might be a stronger indication for the MBT approach than BPD alone.

We have not found other MBT studies investigating differential effects of clinical severity. Generally, evidence-based treatment recommendations are important guidance for decisions on health service implementation. As yet, most evidence-based treatments point to the presence of BPD, rather than the severity of personality pathology. A possible assumption could then be that PD comorbidity was a contraindication for BPD tailored treatment. Also other authors have questioned the impact of comorbidity and PD severity when approaching issues of treatment (Dimaggio, Nicolo, Semerari, & Carcione, 2013). Thus, further studies nuancing indications for such costly treatments are of high clinical relevance. The only reference study on MBT and clinical severity (Bateman & Fonagy, 2013) needs replication.

This study compares longitudinal effects of clinical severity in a sample of patients with BPD who received MBT or a traditional, psychodynamic, group-based treatment programme (PDT). This sample is described in a former study comparing outcomes in the two treatment approaches (Kvarstein *et al.*, 2014). It compared outcomes for patients treated within the same department, but before and after a change in treatment approach, from PDT (period 1993–2008) to MBT (period 2008–2013). It demonstrated that MBT was implementable outside UK settings. Scores of therapists' MBT fidelity were adequate (Karterud *et al.*, 2013), drop-out rates were low, and three-year effect sizes exceeded PDT in significant manners. In this study, the new research question is: Are MBT-PDT benefits associated with the severity of PD? In line with the results of Bateman and Fonagy (2013), we hypothesize an interaction effect between treatment group and severity indicator on outcome.

Materials and methods

Subjects

From a sample of 907 patients with different PDs treated within a specialist clinic for PD during 1993–2013, patients with BPD ($n = 345$) were selected. The clinic used semi-structured interviews for diagnoses of all patients. Patients treated in the first period received traditional psychodynamic treatment (PDT) ($n = 281$, 83% females, mean age 30 years, standard deviation (*SD*) 7), and patients treated after 2008 received MBT ($n = 64$, 84% females, mean age 26 years, *SD* 6). Patients treated in the transition period ($n = 16$) and patients included in an RCT (the Ullevål Personality Project) during 2004–2006 ($n = 25$) were excluded as they had different treatment conditions.

Mentalization-based treatment (MBT)

The MBT programme was an intensive, long-term outpatient treatment in accordance with guidelines (Bateman & Fonagy, 2006), but allowing for up to 36 months total treatment duration. In the first year, patients attended 12 sessions in an MBT psychoeducational group and in addition received weekly MBT individual therapy sessions and group sessions (1.5 hr). In the course of the second and third year, frequencies of individual therapy were gradually reduced, but group sessions continued throughout treatment (up to three years). Therapists followed manuals for individual, group, and psychoeducational MBT (Karterud, 2012; Karterud & Bateman, 2010, 2011). After initial training in the transition period, MBT training courses and seminars were

arranged for therapists regularly throughout the study period. Therapists met for weekly video-based supervision of individual and group therapies. All supervisors were associated with the unit and were experienced clinicians with MBT training. MBT was introduced as a treatment for patients with BPD.

Therapist adherence to MBT

Therapist fidelity to MBT was measured on the basis of video-recorded individual therapy sessions and the MBT Adherence and Competence Scale (Karterud *et al.*, 2013). On a 1–7 scale, ‘good enough’ adherence and competence is defined as level 4. During 2013, five raters evaluated 19 individual sessions (eight therapists in the programme). Mean adherence-level was 4.7 (*SD* 1.2), and mean competence level 4.4 (*SD* 1.2) (Kvarstein *et al.*, 2015).

The psychodynamic treatment programme (PDT)

PDT was a traditional psychodynamic treatment programme (non-manualized). Its design was inspired by day hospital programmes formerly recommended for PD patients (Piper, Rosie, Azim, & Joyce, 1993). While MBT was an outpatient treatment, PDT had a step-down format with an initial, intensive day hospital phase (18 weeks, 11 hr per week). The day hospital provided a psychotherapy programme of several approaches (psychodynamic groups, art therapy, body awareness therapy, cognitive behavioural and solution-focused approaches) (Karterud & Urnes, 2004). After the day hospital phase, patients were offered long-term outpatient psychodynamic group psychotherapy (weekly, 1.5-hr sessions, up to 4 years). PDT was the main approach at the department until 2008. The treatment was less structured than MBT and included patients with different PDs. This study investigates the patients with BPD in PDT.

Therapists

Most therapists in the study worked at the department in both the PDT and the MBT periods. They were experienced, psychodynamic therapists who started MBT training in the transition period. In a team with 11 full-time clinical positions, nine therapists worked in both periods (two psychiatric nurses, three psychiatrists, an art therapist, a physiotherapist, a social worker, and a psychologist). They were engaged in PDT until 2008 and continued as MBT therapists after 2008. Eight of these therapists were qualified group analysts, one in psychoanalysis, 67% were females, and mean age (year 2004) was 48 (*SD* 9) years.

Diagnoses at the start of treatment (baseline)

Diagnoses were based on the Mini International Neuropsychiatric Interview (M.I.N.I.) version 4.4 for DSM Axis-I diagnosis (Sheehan *et al.*, 1994), and the Structured Clinical Interview for DSM Disorders (SCID-II) for DSM Axis-II diagnoses (First, 1994). From 1993–1995, guidelines from the DSM-III-R (Frances, 1994) were followed. From 1996, the unit implemented DSM-IV. Experienced (10–20 years of practice) and specifically trained clinical staff performed the MINI and the SCID-II interviews. Reliability of diagnostic evaluation was tested in 24 videotaped SCID-II interviews and 25 MINI interviews

performed by staff members during 2004–2006. An independent rater performed the second evaluation. The kappa value for BPD (SCID-II) was 0.66. The reliability (ICC 2.1) for total number of SCID-II criteria was 0.83. For the most frequent symptom disorders (MINI), kappa values were as follows: anxiety .58, major depression .51, and dysthymia .60. In the whole sample, the mean number of SCID-II criteria was 17 (*SD* 6). All had a diagnosis of BPD, and 48% had one or more additional PDs (Table 1). In this manuscript, PD criteria refer to fulfilled SCID-II criteria

Table 1. Baseline status: clinical severity

	PDT <i>n</i> = 281	MBT <i>n</i> = 64
PD categories	%	%
Borderline PD	100	100
Borderline PD and additional PDs	48	44
Comorbid PDs		
Schizotypal PD	3	0
Paranoid PD	9	19*
Antisocial PD	4	2
Narcissistic PD	4	5
Histrionic PD	3	0
Avoidant PD	24	17
Obsessive-compulsive PD	6	8
Dependent PD	13	5
Comorbid symptom disorders		
PTSD	5	11
Somatoform.	10	6
Eating	24	19
Mood	73	81
Anxiety	67	69
Substance abuse	30	22
	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Number of disorders		
Number of PDs	1.7 (0.8)	1.6 (0.8)
Number of symptom disorders	2.6 (1.3)	2.7 (1.5)
PD criteria (SCID-II)		
Number of borderline PD criteria	6 (1.1)	6 (1.3)
Number of total PD criteria	17 (6)	15 (6)*
Sum of avoidant and paranoid PD criteria	4 (3)	4 (3)
Dichotomous sum variables	%	%
Sum of total PD criteria > 15	66	52
Sum of avoidant and paranoid PD criteria > 4	48	43
Sum of PD criteria and symptom disorders > 18	55	40

Note. The table demonstrates status for patients when admitted to treatment (MBT or the former psychodynamic treatment programme, PDT). Statistically significant differences between treatment groups are given by * ($p < .05$), by independent sample *t*-test (continuous variables)/chi-square test (categorical variables).

Indicators of clinical severity

Based on the sample distribution of PD pathology and symptom disorders (Table 1), we defined possible indicators of severity: 1: number of PDs, 2: total number of PD criteria, 3: number of BPD criteria, 4: number of avoidant PD criteria, 5: number of paranoid PD criteria, 6: number of comorbid symptom disorders. Supporting the assumption of severity, we found all six of the proposed severity indicators significantly associated with poorer baseline psychosocial functioning as indicated by statistically significant intercept effects (Table 2). More severe interpersonal problems were associated with higher levels of indicators 1, 4, and 6 (Table 3), and more severe symptom distress with higher levels of indicators 2 and 6 (Table 4).

Outcome measure 1: Global assessment of functioning (GAF)

The observer-rated GAF provides a composite score of psychosocial functioning (0–100 scale, Axis V, DSM-IV) (Pedersen & Karterud, 2011). Higher GAF scores indicate better psychosocial functioning, and score 60 represents a cut-off level between mild/no impairment and moderate/severe impairment. Staff therapists were trained (GAF assessment courses by the Norwegian Network of Personality-focused Treatment Programs) and performed GAF evaluations. Reliability of GAF assessments was tested in 1998 (staff consensus scores) and 2001 (independent scores). Clinical vignettes were scored by staff consensus in eight different treatment units (including the studied treatment unit) and by 58 staff members. Reliability for consensus scores was high (ICC 2.1, single measure, absolute agreement definition: 0.94, 95% CI 0.85–0.98). Consistency of GAF scores across units and raters was also high (generalizability coefficients of absolute decision (the score) range 86–.95) (Pedersen, Hagtvet, & Karterud, 2007).

Outcome measure 2: The Circumplex of Interpersonal Problems (CIP)

The CIP (Pedersen, 2002) is a short version (48 items) of the Inventory of Interpersonal Problems-Circumplex version (IIP-C) self-report questionnaire (Alden, Wiggins, & Pincus, 1990). Severity is rated on a 0–4 scale (score 0: 'not at all', score 4: 'extremely') with nine subscales (dominating, self-centred, cold, socially inhibited, non-assertive, overly accommodating, self-sacrificing, intrusive, mistrust). The mean sum-score (CIP) correlates $r = .99$ with the original IIP-C sum-score (Pedersen, 2002). The reliability of CIP is high (four-day test–retest coefficient (ICC, 2.1), $r = .96$, 95% CI: 0.93–0.98) (Pedersen, Hagtvet, & Karterud, 2011). In a non-clinical Norwegian sample, mean CIP scores were 0.5 (SD 0.3) (Pedersen, 2001). Including one standard deviation, the clinical/non-clinical CIP cut-off score is 0.8.

Outcome measure 3: The Brief Symptom Inventory 18 (BSI-18)

The BSI-18 is a self-report questionnaire rating symptom intensity (depression, somatization and anxiety, 0–4 scale, score 0: 'not at all', score 4: 'extremely'). BSI-18 includes an overall severity index, the mean sum-score (BSI). The BSI-18 is adapted from the 53-item Brief Symptom Inventory (BSI), a shortened form of the Symptom Checklist-90-Revised (SCL-90-R) (Derogatis, 1977, 1993, 2000). The BSI-18 applies the same clinical case rule originally developed for the SCL-90-R. A cut-off for clinical/non-clinical ranges of severity (sum-score 0.8) is based on Norwegian sample norms and patient samples (Pedersen &

Table 2. Linear mixed model estimations: global assessment of functioning (GAF)

	Fixed effects		Covariance parameters		
	Intercept (SE)	Slope (SE)	Slope (SE)	Explained slope variation (%)	AIC
Step 1: Model specification					
Open model					8,184
Linear time	46.6 (.29)	0.31 (.02)	0.062 (.01)***	reference	7,972
Step 2: Treatment					
MBT (ref)	48.2 (.7)	0.45 (.04)	0.052 (.01)***	16	7,950
PDT difference	-1.8 (.80)*	-0.18 (.05)***			
Step 3: Severity indicator					
1. Number of PDs	-1.38 (.36)**	ns	0.062 (.01)	0	7,961
2. Number of PD criteria	-0.25 (.05)***	ns	0.057 (.01)	8	7,725
High PD criteria (ref)	45.9 (.4)	0.39 (.04)	0.057 (.01)	8	7,737
Low PD criteria difference	2.4 (.6)**	ns			
3.BPD criteria	-0.78 (.25)**	ns	0.058 (.01)	6	7,746
4. Avoidant PD criteria	-0.57 (.15)***	ns	0.058 (.01)	6	7,742
5. Paranoid PD criteria	-0.57 (.14)**	ns	0.058 (.01)	6	7,748
6. Number of symptom disorders	-0.69 (.21)**	ns	0.061 (.01)	2	7,961
Step 4: Treatment*severity					
MBT-PDT: Number of PD crit.	ns	0.008 (.003)*	0.051 (.01)	17	7,745
MBT:High PD crit. (ref)	47.7 (1.0)	0.41 (.06)	0.049 (.01)	21	7,725
PDT:High PD crit. difference	ns	-0.14 (.07) *			
MBT:Low PD crit. difference	ns	ns			
PDT:Low PD crit. difference	ns	ns			

Notes. AIC, Akaike's indices of model fit.

The table demonstrates linear mixed model estimations of the GAF trajectories (global assessment of functioning) starting with the specified linear reference model (step 1), a linear model including treatment (step 2), linear models including severity indicators (step 3), and finally, models with interactions between treatment and selected severity indicators (step 4). Intercept indicates mean estimated values at the start of treatment (time = 0), and slope indicates mean estimated change-rate per month. Mean estimates are given with standard errors (SE). All models included random effects for intercept and slopes, and the table demonstrates covariance parameter estimates for slopes and calculated explained slope variation. Statistically significant differences are given by *($p < .05$), **($p < .01$) and ***($p < .001$).

Karterud, 2004). The BSI-18 was administered to all patients in MBT. BSI scores for PDT patients were calculated from SCL-90-R.

Repeated outcome assessments

Outcome measures were repeatedly assessed. Patients in PDT had a mean number of 3.4 assessments (SD , 0.8, median 3, range 1–5) over maximum six years, 91% were assessed at

Table 3. Linear mixed model estimations: interpersonal problems (CIP)

	Fixed effects		Covariance parameters		
	Intercept (SE)	Slope (SE)	Slope (SE)	Explained slope variation (%)	AIC
Step 1: Model specification					
Open model					1,741
Linear time	1.75 (.03)	−0.01 (.001)	0.000050 (.00003)*	Reference	1,609
Step 2: Treatment					
MBT (ref)	1.7 (.07)	−0.02 (.002)	0.000042 (.00003)	16	1,603
PDT difference	ns	0.008 (.003)*			
Step 3: Severity indicator					
1. Number of PDs	0.07 (.03)*	ns	0.000047 (.00003)	6	1,607
2. Number of PD criteria	ns	ns	0.000043 (.00003)	14	1,574
3. BPD criteria	ns	ns	0.000046 (.00003)	8	1,579
4. Avoidant (AV) PD criteria	0.05 (.01)***	0.001 (.0005)*	0.000033 (.00003)	34	1,556
5. Paranoid (PAR) PD criteria	ns	ns	0.000042 (.00003)	16	1,578
Sum (PAR+AVPD) crit.	0.03 (.01)*	0.001 (.0004)*	0.000034 (.00002)	32	1,566
High (PAR+AVPD) crit. (ref)	1.82 (.04)	ns	0.000035 (.00003)	30	1,567
Low (PAR+AVPD) crit. difference	−0.13 (.05)*				
6. Number of symptom disorders	0.07 (.02)**	ns	0.000049 (.00003)	2	1,601
Step 4: Treatment*severity					
MBT-PDT: Number of (PAR+AVPD) crit.	ns	0.002 (.009)*	0.000039 (.00003)	22	1,574
MBT: High (PAR+ AVPD) crit. (ref)	1.90 (.12)	−0.02 (.005)	0.000032 (.00002)	36	1,564
PDT: High (PAR+ AVPD) crit. (diff.)	ns	0.01 (.005)*			
MBT: Low (PAR+ AVPD) crit. (diff.)	−0.3 (.2)*	ns			
PDT: Low (PAR+ AVPD) crit. (diff.)	ns	ns			

Notes. AIC, Akaike's indices of model fit.

The table demonstrates linear mixed model estimations of the CIP trajectories starting with the specified linear reference model (step 1), a linear model including treatment (step 2), linear models including severity indicators (step 3), and finally, models with interactions between treatment and selected severity indicators (step 4). Intercept indicates mean estimated values at the start of treatment (time = 0), and slope indicates mean estimated change-rate per month. Mean estimates are given with standard errors (SE). All models included random effects for intercept and slopes, and the table demonstrates covariance parameter estimates for slopes and calculated explained slope variation. Statistically significant differences are given by *($p < .05$), **($p < .01$) and ***($p < .001$).

Table 4. Linear mixed model estimations: symptom distress (BSI)

	Fixed effects		Covariance parameters		AIC
	Intercept (SE)	Slope (SE)	Slope (SE)	Explained slope variation (%)	
Step 1: Model specification					
Open model					2,966
Linear time	1.93 (.04)	−0.02 (.002)	0.000295 (.0001)***	Reference	2,782
Step 2:Treatment					
MBT (ref)	2.1 (.09)	−0.03 (.003)	0.000246 (.0001)***	16	2,774
PDT difference	ns	0.01 (.004)**			
Step 3: Severity indicator					
1. Number of PDs	ns	ns	0.000293 (.0001)	1	2,781
2. Number of PD criteria	0.01 (.01)*	ns	0.000278 (.0001)	6	2,716
3. BPD criteria	ns	ns	0.000290 (.0001)	2	2,722
4. Avoidant PD criteria	ns	ns	0.000282 (.0001)	4	2,722
5. Paranoid PD criteria	ns	ns	0.000286 (.0001)	3	2,721
6. Number of symptom disorders	0.16 (.03)***	ns	0.000287 (.0001)	3	2,754
Number of (PD crit. +sympt. dis.)	0.02 (.01)**	ns	0.000282 (.0001)	4	2,710
High (PD crit. +sympt. dis.)(ref)	2.04 (0.05)	ns	0.000281 (.0001)	5	2,709
Low (PD crit. +sympt. dis.)(diff.)	−0.26 (.08)**				
Step 4:Treatment*severity					
MBT-PDT: Number of (PD crit.+sympt. dis.)	0.01 (.005)*	−0.001 (.0002)***	0.000257 (.0001)	13	2,716
MBT:High (PD crit.+sympt. dis)(ref)	2.13 (.15)	−0.03 (.006)	0.000244 (.0001)	17	2,705
PDT: High(PD crit.+sympt. dis)(diff)	ns	0.02 (.007)*			
MBT:Low (PD crit.+sympt. dis)(diff.)	ns	ns			
PDT:Low (PD crit.+sympt. dis)(diff.)	−0.41 (.15)*	ns			

Notes. AIC, Akaike's indices of model fit.

The table demonstrates linear mixed model estimations of the BSI trajectories starting with the specified linear reference model (step 1), a linear model including treatment (step 2), linear models including severity indicators (step 3), and finally, models with interactions between treatment and selected severity indicators (step 4). Intercept indicates mean estimated values at the start of treatment (time = 0), and slope indicates mean estimated change-rate per month. Mean estimates are given with standard errors (SE). All models included random effects for intercept and slopes, and the table demonstrates covariance parameter estimates for slopes and calculated explained slope variation. Statistically significant differences are given by *($p < .05$), **($p < .01$) and ***($p < .001$).

least three times, and 10% had the maximum of five assessments. MBT patients had a mean number of 3.6 assessments (*SD* 1.5, median 3, range 1–7) over maximum four years, 74% had at least three assessments, and 27% had five or more.

Ethics

All research was performed on anonymous clinical data from a research database with approved procedures and patients written consent.

Statistical procedures

Mixed models (Singer & Willett, 2003) were used for statistical analyses of longitudinal data (Mixed Models, SPSS, version 19). The majority of patients had at least three repeated assessments and the sample fulfilled basic requirements for linear modelling. Modelling procedures were stepwise. Step 1 was establishment of linear models. Time (months from baseline) was modelled as a continuous variable. The time-points of each individual's outcome scores (three dependent variables: GAF, BSI, CIP) were approximated within the periods 1–3 months, 4–6 months, 7–12 months, and the following six-month periods. Step 2 investigated the interaction with treatment and treatment by time alone. The terms Treatment and Treatment * Linear time were added to the models of step 1. Step 3: Investigating the interaction with severity indicators alone. The terms Indicator and Indicator * Linear time were added to the models of step 1. Step 4: Investigating interactions with treatment and the severity indicators, which explained most variance (step 3). The terms Treatment*Indicator and Treatment*Indicator * Linear time were added to the model of step 1. In all models, both intercept and slope interactions were included, thus controlling for baseline variation.

Continuous severity indicator variables were transformed into dichotomous variables ('high–low' severity indicator, cut-off value = sample mean levels). These were included in linear models (steps 3 and 4).

In step 4, we present computed sum variables for models combining two continuous severity indicators where both explained relevant variation in step 3. In the CIP model, this applies to the sum of severity indicators 4 and 5 and, in the BSI model, the sum of severity indicators 2 and 6.

For interpretation of results, each model is judged by the associated deviation of the trajectory of the dependent variable (fixed effects), the change in estimated residual variation (variance components), and change in estimates of log likelihood statistics (indices of model fit, Akaike's information criterion, AIC). Reduction in slope variation is presented in Tables 2–4 as % explained variation (% change from the slope variation in the initial linear random coefficients model, step 1).

To illustrate longitudinal heterogeneity – possible responders and non-responders within the two treatment conditions, and the grounds for further investigation of variability, we composed three subgroups based on LMM predicted GAF levels after 18 months of treatment, those with levels within a poor range (<50), moderate (50–60), and good range (>60).

Results

Step 1: The linear model

Linear trajectories captured significant longitudinal trends in the data for all dependent variables ($p < .001$), and log likelihood estimations of model fit indicated significant

improvements from an unconditional model to a linear random coefficients (intercept and slope) model (critical values for chi-square statistic: $p < .01$) using an unstructured covariance type.

Step 2: Impact of treatment alone

Treatment (MBT/PDT) was added as a categorical predictor to each model. The effect of treatment was the main result in the former study (Kvarstein *et al.*, 2014), rendered significantly larger benefits for patients in MBT than PDT on all the outcome measures, and explained 16% residual slope variation in the different models. Estimates for step 2 are given in Tables 2–4.

Outcome heterogeneity in the sample

Mean treatment duration in the whole sample was 18.5 months (SD 18). Heterogeneity of outcomes was greater in PDT than MBT. In PDT, prevailing, poor GAF levels were estimated for 16% (LMM predicted GAF <50 after 18 months), whereas 37% had good results, above the defined clinical cut-off (LMM predicted GAF >60 after 18 months). In MBT, prevailing poor GAF levels were estimated in 4% (LMM predicted GAF <50 after 18 months) and 69% were above the defined clinical cut-off (LMM predicted GAF >60 after 18 months).

Step 3: Impacts of severity indicators alone

Separate impacts of each of the six severity indicators were investigated as continuous variables in the three linear models (GAF, CIP, BSI). In the GAF models, associations with severity indicators alone and GAF change over time were generally modest. Among indicators, the strongest associations were found for severity indicator 2: total number of PD criteria, which explained 8% GAF slope variation (Table 2). In the CIP models, associations with severity indicators and CIP change over time were strong for indicator 4: avoidant PD criteria. The analyses indicated that increasing numbers of avoidant PD criteria were significantly associated with increasingly slower CIP change over time ($p < .05$, 34% explained slope variation). A noteworthy impact was also found in the model including an interaction with indicator 5, paranoid PD criteria (16% explained slope variation, Table 3). In the BSI models, associations between severity indicators and BSI change over time were modest, but noteworthy for indicator 2: total number of PD criteria (6% explained slope variation), and indicator 6: number of symptom disorders (3% explained slope variation) (Table 4).

Step 4: Impacts of treatment by severity indicators:

For the interaction with treatment, the severity indicators which explained most slope variance were selected and included in linear models. These models rendered significant interaction effects between treatment group and severity indicator on outcome – longitudinal change differences increased by increasing clinical severity. In the GAF model, a higher number of total PD criteria (indicator 2) were associated with slower GAF improvement for patients in PDT, but not in MBT ($p < .05$, 21% explained slope variation, Table 2). In the CIP model, higher numbers of avoidant and paranoid PD criteria (sum variable: indicators 4 and 5) were associated with slower CIP improvement for patients in

PDT, but not in MBT ($p < .05$, 36% explained slope variation, Table 3, Figure 1). In the BSI model, higher numbers of total PD criteria and symptom disorders (sum variable: indicators 2 and 6) were associated with slower BSI improvement in PDT, but not in MBT ($p < .05$, 17% explained slope variation, Table 4, Figure 2). In all models, inclusion of treatment*severity indicator*time explained more GAF, CIP and BSI slope variation (respectively) than inclusion of treatment*time or severity indicators*time alone (Tables 2–4).

Discussion

Our main finding indicated that the difference in clinical benefits of MBT versus the former psychodynamic treatment programme, PDT, increased with increasing PD severity. PD severity seemed to have little impact on clinical improvement for patients in MBT, but effects of PDT decreased with increasing PD severity. Severity of PD was defined by several possible indicators recording the number of PDs, different PD criteria and comorbid symptom disorders (Bateman & Fonagy, 2013; Yang *et al.*, 2010).

Evidence base for treatment interventions should include studies of indications and contraindications (Choi-Kain, Albert, & Gunderson, 2016; Feenstra, Luyten, & Bales, 2017; Meuldijk, McCarthy, Bourke, & Grenyer, 2017). The current study is one of few BPD treatment studies focusing on impacts of comorbidity and severity. We ask, is MBT particularly helpful for patients with a clear BPD condition or is it also beneficial for BPD patients with more severe conditions? Which patients should preferably be selected for

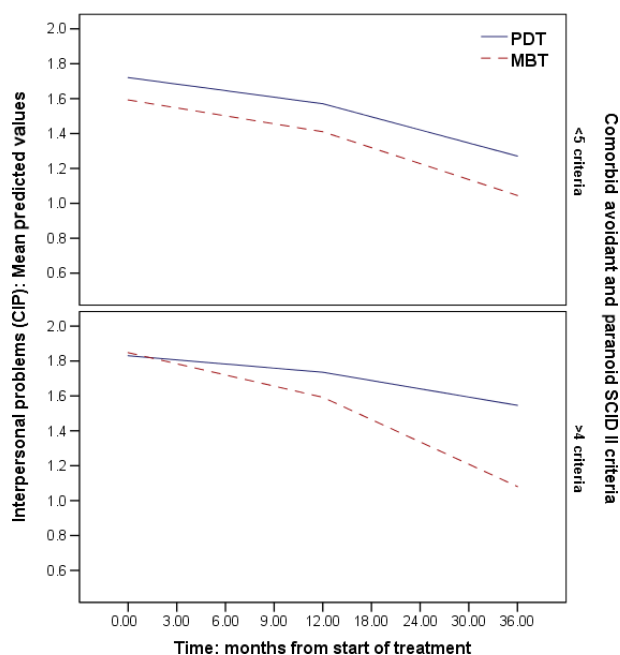


Figure 1. Longitudinal trajectories: interpersonal problems and severity of PD. Illustrates differences between MBT and PDT associated with increasing PD comorbidity. LMM trajectories estimated for patients with BPD in MBT (dashed line) and PDT with higher (>4 criteria) and lower (<5 criteria) levels of additional, comorbid avoidant, and/or paranoid PD criteria are demonstrated. [Colour figure can be viewed at wileyonlinelibrary.com]

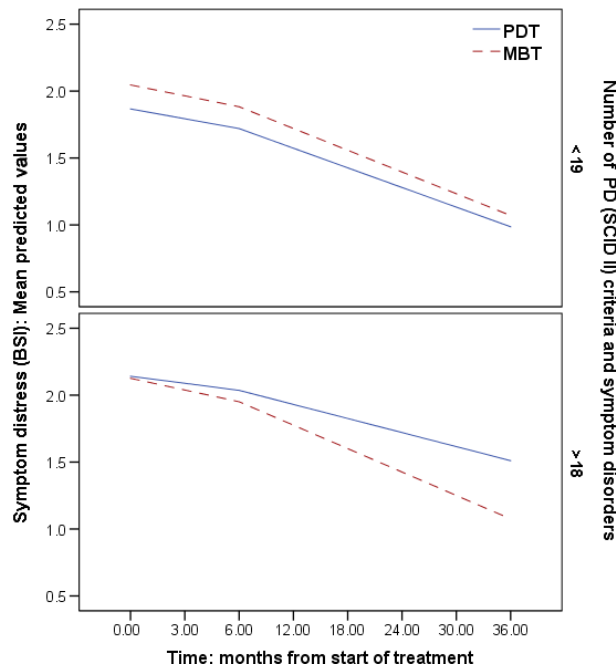


Figure 2. Longitudinal trajectories: symptom distress and PD comorbidity. Illustrates differences between MBT and PDT associated with increasing PD comorbidity. LMM trajectories estimated for patients with BPD in MBT (dashed line) and PDT with higher (>18) and lower (<19) numbers of additional, comorbid PD criteria and/or symptom disorders are demonstrated. [Colour figure can be viewed at wileyonlinelibrary.com]

such a highly specialized, long-term treatment? Apart from the reference study on MBT and clinical severity (Bateman & Fonagy, 2013), we have not found corresponding investigations of evidence-based BPD treatments (Cristea *et al.*, 2017; Stoffers *et al.*, 2012). Generally, few psychotherapy trials recruit such poorly functioning patients. Studies of the longitudinal course for BPD have, however, demonstrated how PD comorbidity can have a negative impact (Zanarini, Frankenburg, Vujanovic, *et al.*, 2004). In this study, results point to MBT as a treatment more indicated for patients with severe disorder than the comparison treatment programme, PDT. These results are in line with findings in the MBT reference study (Bateman & Fonagy, 2013). The research thus suggests that patients with severe psychopathology can have a treatment potential given appropriate health service organization

Most evidence-based BPD treatments are intensive and long-term (Stoffers *et al.*, 2012). Treatment costs may therefore be high. However, for both dialectical behavioural therapy (DBT) and MBT, total cost-saving potentials have been demonstrated as costs of emergency services and hospitalizations are reduced (Bateman & Fonagy, 2003; Priebe *et al.*, 2012). Such cost-saving arguments are most relevant for patients with the more severe PDs – when patients with massive use of costly health care systems improve – when the high costs of specialized treatment are outweighed by reduced hospital/emergency costs. In addition, it is noteworthy that major societal costs are associated with psychosocial and occupational impairments typical of severe personality disorder, including features of both BPD, paranoid or avoidant PD (Wilberg, Karterud, Pedersen, &

Urnes, 2009; Zanarini, Frankenburg, Reich, & Fitzmaurice, 2010). Accordingly, improvement of social impairments may also contribute to balancing high treatment costs (Meuldijk *et al.*, 2017). The present study interestingly indicates that comorbid avoidant PD traits in particular distinguished long-term effects of MBT from PDT.

Why should a specialized, structured PD treatment, such as MBT, be more effective than PDT for severe PD patients with a combination of BPD, avoidant, and possibly paranoid PD traits? Several theories may be apparent.

Firstly, we point to patients' treatment adherence in itself. In a previous study of PDT, 45% of poorly functioning BPD patients dropped out of treatment within the first three months (Kvarstein *et al.*, 2004). For less severe BPD patients in PDT with better treatment adherence, five-year improvement of symptom distress indicated non-clinical levels, and three-year follow-up of health service costs indicated substantial reductions (Kvarstein & Karterud, 2013; Kvarstein *et al.*, 2013). These good results are not unlike the benefits also seen in the present study for patients with BPD in PDT with less severe PD. Important MBT benefits for more severe patients may therefore be enabled by low early drop-out rates (Kvarstein *et al.*, 2014).

Secondly, we highlight a characteristic component of MBT, unlike PDT – a pedagogically structured psychoeducational group in the early phase of treatment. This psychoeducational MBT ingredient has the specific aim of improving treatment adherence and alliance in an early, vulnerable treatment phase. In a qualitative interview study, MBT patients indeed expressed that this psychoeducation felt relevant and gave new perspectives and better understanding of their problems and the treatment (Ditlefsen, 2016). Psychoeducational interventions for BPD have recently been found effective and are recommended as adjunctive to other therapy (Zanarini, Conkey, Temes, & Fitzmaurice, 2017). It is possible that the MBT programme entails a more tailored, explicitly informative and motivating process in the early phase of treatment.

Thirdly, the two compared treatments in this study have different formats, and it is possible that such format differences had a greater impact among more severely disordered patients. While MBT was an outpatient treatment from the start, PDT was two-phased, with a step-down from day hospital to outpatient group therapy as a stand-alone treatment. Qualitative interviews of patients with BPD who dropped out of PDT have indicated that the transition from the multicomponent day treatment to the new outpatient psychotherapy group was challenging (Hummelen *et al.*, 2007). Issues of attachment, separation distress, and ruptures of early alliance in therapy are likely to be more problematic with increasing severity of disorder. In such a perspective; the step-down format of PDT may have been more challenging for severely disordered patients than MBT. The MBT treatment format had no abrupt transitions.

Moreover, the group therapy format is central in both treatments, but MBT groups are more structured (Folmo *et al.*, 2017) than PDT groups. Several other studies have indicated that the less structured psychodynamic groups, as in PDT, may have limitations for poorly functioning BPD patients. Firstly, the qualitative interviews of female drop-out patients with BPD (Hummelen *et al.*, 2007) indicated a distressing experience of strong negative emotions in a psychodynamic group setting. Secondly, a more recent quantitative study including patients with BPD in stand-alone, outpatient psychodynamic group therapy, associated early drop-out with enhanced symptom distress and troubling experience of the group climate (Kvarstein *et al.*, 2016). Thirdly, an RCT, which compared long-term effects of a group-based step-down treatment programme (as PDT) to individual therapy, suggested that the group-based treatment was challenging for patients with more severe psychopathology. In this study, individual therapy was superior to the

group-based programme for the subgroup of poorly functioning PD patients with poorer capacities for mentalizing (Antonsen *et al.*, 2016). In the present study, in contrast to PDT, MBT patients did not receive group interventions alone, but in combination with individual therapy. This may have been more supportive for poorly functioning patients. The initial day hospital phase of PDT implied an intensive, group-based start of treatment.

Our fourth perspective is on the primary and explicit aim of the MBT therapist – to maintain a joint focus on mentalizing and mentalizing deficits in therapy. In the present study sample, although we cannot report measures of the patients' mentalizing capacity, the BPD patients with severe personality pathology in PDT and MBT are likely to be a comparable cohort with poor personality functioning and severe mentalizing deficits (Antonsen *et al.*, 2016; Vaskinn *et al.*, 2015). It is noteworthy that MBT-PDT outcome differences were largest among these patients and conceivable that an intervention style explicitly focusing on mentalizing deficiencies could be important.

The style of treatment interventions can be assessed by fidelity ratings indicating how therapists follow a specified model of treatment. This project, as the first of MBT studies, reports that MBT therapist interventions had acceptable fidelity (Karterud *et al.*, 2013). We can therefore, with reasonable likelihood, state that MBT therapists generally delivered the intended style of intervention. The present study cannot conclude on how MBT fidelity impacted treatment. However, other research of therapist factors in psychotherapy sessions has related high ratings of MBT adherence and competence in therapist interventions to improved mentalizing in patients during treatment sessions (Moller, Karlgren, Sandell, Falkenstrom, & Philips, 2017). Further consequences for long-term outcomes remain to be investigated.

A qualitative investigation with a case study design points to different intervention styles in MBT and PDT (Kalleklev & Karterud, 2018). The study compared therapist interventions in group sessions in MBT ($n = 1$) and PDT ($n = 1$). The MBT group therapists were found more active and more focused on emotional and mental states of group members. In the presented PDT case, the group therapists intervened less frequently, but engaged in clarifying events, confronting and interpreting maladaptive functioning. To which extent a case study is representative is uncertain. PDT was neither a manualized treatment nor a model specifically addressing BPD problems. Systematic fidelity rating was unavailable in this period of data collection.

Finally, we introduce the impact of MBT as a whole. MBT represents more than merely a specific style of intervention and more than a specific format. It is a comprehensive treatment model and involves closely collaborating therapist teams. Its structure is based on an overarching theory of core personality pathology among patients with BPD. The manuals define a style of intervention tailored to relevant personality problems. All MBT components – psychoeducational, individual, and group sessions – identify and address issues of emotional regulation and different aspects of mentalizing. Overall, it is possible that MBT may represent a clearer strategy for therapists and therapist collaborations. Such strategies may be particularly beneficial in the face of poorly functioning BPD patients. In contrast, in the non-manualized psychodynamic treatment, although it is a finely tuned, relational form of psychotherapy, therapists may have been less focused on patients' mentalizing deficits.

The comorbidity of avoidant PD traits indicates that the sample included patients with severe problems in social interaction, and high levels of anxiety/insecurity (Eikenaes, Hummelen, Abrahamsen, Andrea, & Wilberg, 2013; Eikenaes, Pedersen, & Wilberg, 2015; Skodol, Geier, Grant, & Hasin, 2014). Although MBT is 'tailored' for BPD, it is conceivable that patients with such additional PD traits would also benefit from carefully developed,

individual case formulations and a long-term approach allowing for work on establishing a stable therapist attachment. A structured and pedagogical therapy setting may be more predictable and manageable than an unstructured setting. Treatment approaches addressing more restrictive personality traits correspondingly emphasize an explicit focus on core personality problems, pathways to expand reflexivity, and arenas for graded exposure (Dimaggio *et al.*, 2012; Weinbrecht, Schulze, Boettcher, & Renneberg, 2016).

Limitations

Conclusions are limited by a naturalistic design and no randomized, controlled comparison.

However, the study compares two clinically representative treatments. MBT and PDT were given in different time-periods, but within the same unit and by many of the same therapists. Patients were recruited from the same geographical area, and as demonstrated in Table 1 (baseline data) largely represented comparable cohorts with respect to personality pathology and severity. In addition, statistical analyses controlled for baseline differences.

Therapists were stable over time. Largely, the same therapists worked in the former treatment, PDT, and in the new approach, MBT. It is conceivable that therapists over the years have gained competence, experience, and ability to work together in a team. The positive effects of MBT over PDT in the current study with greater capacity for treating poorly functioning patients may therefore reflect more than the impacts of treatment approach alone.

The total sample size in this study is large ($N = 345$). Heterogeneity of outcomes was considerable in the large subgroup, PDT ($n = 281$) where we also found significantly altered change patterns associated with severity indicators. One may argue that the sample size in the MBT arm ($n = 64$) is on the small size. In terms of power, the current size should be capable of capturing large and moderate differences, but may not be large enough to detect small differences. The MBT arm had equivalent sample size as the MBT group in Bateman and Fonagy's reference study (Bateman & Fonagy, 2013). Nevertheless, there is a risk that small differences related to severity were not detected in MBT, and findings must therefore be interpreted with due caution and need replication in larger MBT samples. However, our data suggest that heterogeneity of outcomes was generally more moderate in MBT. This also indicates less deviating impacts of subpopulations such as patients with more severe disorder.

PDT included patients with different PDs. For this comparison study, we therefore selected patients with BPD in PDT from a large cohort of mixed PDs where BPD constituted between 30 and 40% (Kvarstein *et al.*, 2013). It follows that in our selected PDT cohort, patients attended treatment groups together with patients with other PDs, which is unlike the BPD groups of MBT and may limit the value of comparison. Traditionally, in PDT, groups composed of many patients with severe BPD may be considered difficult to manage. However, it is unlikely that the negative impact of severity in PDT was due to an accumulation of severe BPD problems within groups. Rather the opposite may have been the case. Severe BPD patients were more likely to have been single cases in groups together with patients with other PD problems, whereas in MBT, a more homogenous sample of patients with BPD attended the programme together.

The study has a longitudinal design with repeated measurements over a long time span, and differences between patients' number of assessments are a possible bias. We therefore used recommended, advanced, statistical methods in order to incorporate

unbalanced data (Singer & Willett, 2003) and minimize loss of patient data due to incomplete series. The validity of the chosen linear change model is confirmed by high correlations (r) between model-based predicted values and observed values (GSI: $r = .85$, CIP: $r = .86$, GAF: $r = .89$). For all dependent variables, we investigated the deviance of linear change associated with different assessment numbers (Hedeker & Gibbons, 1997) and found no significant linear deviation ($p > .05$).

Main conclusions

The results of this study are in line with other research and indicate a potential for MBT as a clinically relevant treatment alternative for severely disordered BPD patients, which may be difficult to manage in traditional psychotherapy.

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