Original Article

The MMPI profile traits of borderline personality disorder

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Abstract

Objectives: Distinctive, effective and systematic psychological test methods to be used to di-agnose, treat and research borderline personality disorder (BPD) need to be developed and adminis-tered. This study investigates the MMPI profile characteristics of BPD to determine the original pro-file of BPD.

Methods: This comparative and descriptive study was conducted in the psychiatric clinic of a university hospital from 2000 to 2013. Its sample consisted of 51 patients with BPD, 31 patients with BPD and comorbid personality disorders and 31 patients with no psychiatric diagnosis according to DSM-IV. The MMPI was administered individually to the subjects diagnosed with BPD before the start of treatment and in face-to-face interviews with all participants. The study used chi-square, inde-pendent sample t-test, and the differences between the patient and control groups' MMPI subtests were examined using logistic regression.

Results: There were statistically significant differences between all the subtests except sub-test MF (5) in the compar-ison between the BPD and control groups. Sub-tests 4, 8, 3 and 2 were found to be high in the MMPI profiles of the BPD group. Logistic regression found that subtest Pd (4) differ-entiates 60% of cases with and without BPD. Along with subtest K, this predictability rises to 70%, and with subtest D (2), it rises to 74%. There were no statistically significant differences between the comorbid and non-comorbid BPD patients' mean profiles, subtests and code types.

Conclusion: Significant differences were found in the statistical analysis between BPD and control group, and this result is similar to those in the literature. There were no significant differences in the MMPI profiles of the patients with and without comorbidities. BPD characteristics were more dominant in both of these groups than in the control group, and the subtests differed in BPD in multi-ple cases.

Keywords: Borderline personality disorder; MMPI; personality assessment.

What are the known facts about the subject?
• Significantly higher values were obtained in the F, 4, 6, 8, and 2 subscales of the MMPI, which is frequently used with borderline personality disorder patients.

How does this article contribute to the known facts?
• The MMPI values of individuals with and without comorbid borderline per-sonality disorder were similar. In the borderline group, the highest ranking subscales were 4, 8, 3, and 2, compared with the control group without a psy-chiatric diagnosis, and in the validity subscales, an inverted V graph with low L and K, and high F was observed, differentiating borderline personality disorder.

What is its contribution to practice?
• The results of this study demonstrated that the MMPI can make important and reliable contributions to distinguishing the diagnosis of borderline per-sonality disorder.

Borderline personality disorder (BPD) is a chronic mental disorder that emerges in adoles-cence and is character-ized by impulsive control difficulties, insufficiency in tolerat-ing anxiety, serious interpersonal relation problems, inconsis-tency in self-perception and mood, self-injurious behaviors, high suicide risk and severe dysfunction.[1] BPD predisposes patients for other first axis psychiatric disorders and also wors-ens the course of existing first axis psychiatric disorder, which complicates the clinical picture and makes it difficult to diag-nose accurately.[2,3] It has been reported that BPD is seen in 2% of the general population.[2,3] They form 10–11% of the psychi-atric patients that receive outpa-tient treatment, and 19–20%

of the psychiatric patients that receive inpatient treatment. Of the patients that were diagnosed with this disorder, 76% were women. It was also reported that this disorder is three times as more common in women than men.[2–5] The rate of BPD in all personality disorder (BP) diagnoses has been reported as 21–62% in different studies. Suicide attempts were observed in 75% of BPD cases, and self-injurious behaviors were seen in 60–70% of them.[6–8]

Diagnostic and psychotherapy process evaluation studies that were conducted with BPD pa-tients found that BPD patients have multiple comorbidities in the first and second axes,[8–10] and that the most common comorbidities on the first axis were (96%) mood, (88%) anxiety, (64%) substance abuse, (53%) eating disorders and 10% somatoform disorders.[10] Two or more PDs were found to-gether in at least 50% of the patients with second axis disorders.[5,10–15] Studies have found that BPD pa-tients were also diagnosed with addicted, narcissistic and passive-aggressive PDs, especially schizo-typal, histrionic and antisocial PDs, and their symptoms matched with each other. [10,12,16–19] The exist-ence of multiple PD diagnoses complicates the diagnosis of BPD and makes treatment and psycho-ther-apy processes difficult.[11,13,18] A study assessing borderline and schizotypal PD comorbidity sug-gested that the co-oc-currence of borderline and schizotypal PD features creates a more deteriorated profile in psychological tests compared to one diagnosis.[12] Some studies have found a significant con-nection between histrionic PD and BPD, and stated that they were seen together.[20–22] There are also studies reporting that narcissistic PD has an important rate of accompanying BPD,[14] and high-lighting other personality disorders in comorbidi-ties.[23]

In Turkey, studies of PD are limited and are mostly case studies. [24] The studies conducted by Boğoçlu[25] (2003) and Eren et al.[9] (2014) found that almost all the patients with BPD diagnoses had comorbidity in the second axis; they also had higher rates and values in traumatic history, suicide at-tempts, impulsivity and self-injuring than other patients with PD diagnoses.

The Minnesota Multiphasic Personality Inventory (MMPI) is a comprehensive personality test that can measure personal-ity disorders. It has 3 validity and 10 clinical subscales.[26] In BPD diagnosis, all of the many studies of the description of a unique and sensitive profile found the highest subtests to be typically Sc (8), Pd (4) and D (2).[27–36] This profile shows 824 code types that Gilberstand and Duker[26] identified roughly. Significantly higher scores were found in the borderline group on subtests F, 4, 6, 8 and sometimes 2. Of borderline patients, 78% were classified correctly by discriminant anal-ysis and MMPI subtests.[31] Reviews of the literature show that gener-ally subtests 8, 4 and 2 were fol-lowed by subtests 6 and 7, and most of the subtests were higher than a score of 70 T.[36] In the patient group diagnosed by the Diagnostic Interview for Borderlines (DIB), the mean profiles were found to be 8, 2 and 7.[33] Another study reported an elevation on subtests 4, 2, 8, 7 and 6.[37] The consistency between these studies is interpreted

as an indication of the validity of BPD diagnosis using the 824 code types.

Many studies have shown the sensitiveness of the MMPI's va-lidity scales in BPD diagno-sis.[27,29,31–35,38,39] These studies have reported that patient scores on validity subtest F were ele-vated, and the values in subtests K and L were low (<50). Thus, these validity scales produce a typical and sharp inverted V shape on the test graph.

It is a rare occasion that the BPD diagnosis is seen as the only diagnosis, especially in inpa-tients. In the literature, comor-bidity is seen in various BPD studies because it is difficult to exclude this diagnostic coexistence.[27,29,31–34] However, this diagnostic coexistence makes it difficult to identify a MMPI profile that is specific to the diagnosis of BPD and to correlate results only with the diagnosis of BPD. In this case, it is not clear whether the profile obtained was related to the diag-nosis of BPD or to other accompanying PD diagnoses. In the literature, the patients that were diagnosed with BPD and ac-companying multiple PD diagnoses were reported to be the most challenging patient group for men-tal health workers, especially inpatient nurses.[11] It has been reported that the clinical picture was cha-otic due to large number of comor-bidities, which made it more difficult to plan more effective and unique interventions in treatment and psychotherapy of patients.[1,11,21] It is necessary to develop and employ effective and systematic psychological testing methods that facilitate understanding patients to contribute to eliminating complex-ities in the diagnosis, treatment and study of BPD and comor-bid BPD patients.

Considering these reasons, the introduction of a unique and sensitive MMPI profile within the process of BPD diagnosis is clearly important to contribute to diagnosis and clinical prac-tices. Within this scope, this study aimed to investigate MMPI profile characteristics of BPD and comorbid BPD patients, and to demonstrate a distinctive, consistent, and unique profile of BPD diagnosis in all pa-tients that do and do not have comor-bidities.

Materials and Method

Research Design

This is a comparative and descriptive study.

Population and Sample

The population of the study was composed of all patients who visited from 2000 to 2013 the social psychiatry service (SPS) in the Psychiatry Program of Istanbul University's Medical Fac-ulty that provides the outpatient service of diagnosis, treat-ment and psychotherapy to individuals with PDs. The sample of the study consisted of 113 individuals; 51 patients were di-agnosed with BPD as a result of SPS team's evaluation based on DSM-IV second axis criteria and 31 patients that were di-agnosed with BPD and second axis comorbidity with MMPI tests that were accepted as valid. The sample also included 31

healthy individuals in the control group with no psychiatric di-agnosis. The inclusion crite-ria were having minimum primary school degree, being older than 18 years old, and agreeing to partic-ipate in the study on a voluntary basis. The exclusion criteria were having no diagnosis of a comorbid psychosis, bipolar disorder, developmental retardation in addition to leaving 20 or more items on the MMPI blank, having a score of 90T or above on one of the validity subtests F. The control group was randomly selected from volunteers who had no psychiatric complaints and had no prior psychiatric diagnosis, and whose age, education and gender characteristics were similar to those of the patient group. The MMPI was adminis-tered to the patients in the first admittance to the service prior to any treatment. It was administered individually to the pa-tients in the control group by invitation to an in-terview room. The administration and evaluation of the test, profile drawing, code type determination and interpretation of the results were performed by a clinic psychologist trained in this area. The MMPIs of 6 BPD-diagnosed patients that did not meet the study criteria were deemed invalid.

Data Collection Tools

The Minnesota Multiphasic Personality Inventory (MMPI) is one of the most common of scale-type personality invento-ries. It consists of 550 items that are responded to as Correct, Incorrect and I don't know (16 items are repeated in the book form, which makes a total of 566 items). The per-sonality test is intended to assess the personal and social cohesion of indi-viduals objectively. It has 3 validity and 10 clinical subscales. It is mainly intended for use in clinical practice. However, each subtest is not expected to measure etiologic or prognostic characteristics independently. The test is used according to the profile characteristics of the various combinations of sub-tests. The MMPI was first published in 1943; it was created by Hathaway and McKinley and subsequently translated and standardized in many countries.[40] Its adaptation to and stan-dardization in Turkish was performed by Savaşır (1981).[41]

The subtests were divided by psychiatric diagnosis categories, and the questions were divided by their power of distinguish-ing normal individuals from the patients that are in certain psychiatric diagnosis groups. The validity subtests are: L (lie), F (frequency or infrequency), K (correction). They are intended to evaluate patients' attitudes towards being tested. The clin-ical subtests by code types are: 1- Hs (hypochondriasis), 2- D (depression), 3- Hy (hysteria), 4-Pd (psychopathic deviate), 5- Mf (masculinity/femininity) 6- Pa (paranoia), 7-Pt (psychas-thenia), 8-Sc (schizophrenia), 9-Ma (hy-pomania), 0-Si (social introversion).

In practice, the validity of the test is checked first. Then, the raw scores that are accepted as valid on the MMPI are calculated, and they are graphically displayed on the profile sheet which in-cludes the T scores developed in accordance with Turk-ish standardization. The profiles obtained in this process are evaluated using certain forms of interpretation. One of these

forms must specify the code type. At this stage, the subtests are evaluated in terms of obtaining a T score of 70 or higher. Code types indicate the highest two or three tests on the pro-file. These are generally applicable for clinical subtests. Differ-ent code type interpretations have been developed. MMPI profiles should be evaluated by mental health professionals trained in this area. Some MMPI profile patterns have been de-termined precisely. Frequently emerging profiles include: con-version V or psychosomatic V, para-noid V, bird wing, passive-aggressive V, psychotic curve, neurotic curve, floating profile.[40,41] All values from Hs to Ma in the floating profile pattern are above 70 T, and this situation is accompanied by the elevation in subtest F scores. This profile is often regarded as a profile specific to BPD.[31,34,35]

The evaluation and interpretation of the subtests can include validity subtest L being an assis-tance to detect patients' ef-forts to represent themselves as better than they really are. In addition, valid-ity subtest F subtest helps identify the individ-uals that respond to the items atypically or in an abnor-mal way. This subtest involves a wide range of maladaptation, and is composed of various items in-cluding being close to coop-eration and not being socially desirable. These expressions are rarely used by individuals that do not have a psychiatric di-agnosis. Validity subtest K reflects individual's efforts to deny mental disorder and introduce oneself better than they really are, or present it worse than it is by exaggerating their status. This subtest is used to improve scales' power to distinguish.

Clinical subtest Hs (1) reflects paying too much attention in bodily functions. Clinical subtest D (2) indicates hopelessness, dysphoria, anhedonia, feeling of self-worthlessness and sleep disturb-ances. Clinical subtest Hy (3) is addressed to individ-uals that makes a high use of denial, have a sub-missive atti-tude, display a naïve and childish egoism, have anxiety-related somatic complaints, feel concerned about the probability of being rejected by the group they belong to, and have a strong need for being accepted and loved. Clinical subtest Pd (4) reflects the difficulties in interpersonal relations, impulse and anger control issues and impulsivity. Clinical subtest Mf (5) addresses to the characteris-tics related to sex and man-hood-womanhood. Clinical subtest Pa (6) is used to determine paranoia, suspiciousness, strict thought and hostility. Clinical subtest Pt (7) reflects anxiety, nervousness, am-bivalence, per-fectionism and psychasthenic states. Clinical subtest Sc (8) is used to determine unusual thought processes and incidences of weirdness in perception. Clinical subtest Ma (9) is used to deter-mine the level of uncontrolled energy. Finally, clinical subtest Si (0) is reflects social withdrawal, sen-sitivity for the thoughts of others and shyness.[40,41]

Evaluation of the Data

The data that were obtained in the study were assessed using SPSS 15.0 for Windows (Release 15.0). First, the socio-demo-graphic characteristics of the two groups and the mean MMPI scores were determined, and then the values for the study and

control groups were compared. The independent samples t-test and chi-square test was used to compare the mean scores of the study and control groups. MMPI subtests' ability to distinguish between patient and control groups was determined us-ing logistic regression. The threshold for significance was accepted p<0.05 for all study findings.

Ethical Dimension of the Study

Informed consent and written consent were obtained from the participants in the study, and in-stitutional permission was obtained from the clinic where the study was conducted.

Limitations of the Research

In this study which was intended to investigate the MMPI pro-file treats of Borderline PD and comorbid BPD patients, the small number of patients in comorbid BPD group and the het-erogeneity of symptoms limited the discussion. In addition, there are no studies of the MMPI profiles of BPD pa-tients in Turkey, which limited the comparison of the data obtained in this study.

Results

BPD and Control Group Data

The BPD group consisted of 82 patients. Of them, 67 (82%) were female and 15 (18%) were male. The control group con-sisted of 31 individuals. Of them, 21 (68%) were female, and 10 (32%) were male. The mean ages of the BPD and control groups were 24.76 (SD=5.92) and 26.74 (SD=6.13) years, re-spectively. No significant differences were found between the

BPD and control groups by age, education level or gender. Of the BPD group, 65 (79%) were single, 14 (17%) were married, and 3 (4%) were divorced. Of the control group, 19 (61%) were single, and 12 (39%) were married. A significant difference was found by marital status (χ^2: 6.69, df: 2, p<.05).

Significant differences were found between the MMPI scores of the control group and the BPD-diagnosed group. The com-parison between BPD and control groups in Table 1 shows that there are statistically significant differences between the BPD and control groups' scores on all the subtests except sub-test Mf (5). Code 4832 increased in the mean group profiles of the BPD patients. The fol-lowing subtest was 7. The control group's highest score (57.68 T) was on subtest K, and their lowest (44.61 T) was on subtest Mf (5); however, all their sub-test scores were normal. A statistically signifi-cant difference was found between the patient and control groups (χ^2: 40.51, df: 1, p<0.001) in their floating profiles. In our study, 67% of the BPD patients showed floating profile characteristics.

An individual analysis of the subtests in MMPI profiles re-vealed a significant difference be-tween patient and control group regarding the highest subtest score. The BPD group's subtest Pd (4) score was 27% higher. Their subtest Sc (8) score was 17% higher, and their subtest Hy (3) score was 13% higher. No statistically significant differences were found between the general MMPI scores of the BPD patients and the BPD pa-tients with second axis comorbidity in terms of binary code, triple code and floating profile type. However, in the logistic regression performed to find out the extent which BPD diag-nosis was predicted by the MMPI subtests, subscale Pd (4) was found to be statistical-ly significant in the prediction of BPD as Table 2 shows (Nagelkerke R^2=.60, p=.001). As subscale Pd (4) scores increased, the likelihood of being diagnosed with BPD

Table 1. Comparison of the MMPI T scores of the BPD and control groups						
	BPD Group (n=82)		Control Group (n=31)			
Variables	Mean	Standard deviation	Mean	Standard deviation	Sd	t
L-Lying	41.22	9.19	47.45	11.04	111	3.039**
F-Abnormality	64.56	15.91	45.35	8.67	111	-6.363***
K-Defensive	44.01	9.73	57.68	11.61	111	6.308***
Hypochondria	62.09	12.25	50.00	11.53	111	-4.754***
Depression	66.13	10.85	47.29	9.93	111	-8.423***
Hysteria	66.74	11.91	53.48	10.50	111	-5.449***
Psychopathy	70.26	10.87	50.23	9.60	111	-9.014***
Masculinity/Femininity	49.16	12.11	44.61	10.22	111	-1.854
Paranoia	64.55	12.10	45.06	10.05	111	-7.979***
Psychasthenia	65.04	10.81	48.19	8.20	111	-7.855***
Schizophrenia	67.84	13.88	45.94	8.11	111	-8.256***
Hypomania	62.89	10.89	46.16	10.02	111	-7.442***
Social introversion	57.87	12.01	46.61	9.58	111	-4.681***

*p<.05; **p<.01; ***p<.001.

Table 2. The effects of independent variables on group variables as determined by logistic regression

Dependent	Independent	β	R^2	OR	Wald	Sd
Group	Psychopathic Devi-ate(Pd)	.189***	.600	1.208	25.030	1
	Defensiveness (K)	-.100**	.701	.905	11.415	1
	Depression (D)	.083*	.736	1.086	4.779	1

*p<.05; **p<.01; ***p<.001.

increased, too (β=.189, OR=1.208). In this model, Pd (4) variance distinguished the variance of the BPD diagnostic variable at a rate of 60%.

With the impact of the K variable, the model's power to predict BPD diagnosis variable reached 70% (R^2=.70, p=.001). The likelihood of BPD diagnoses increased (β=-.100, OR=.905) in inverse proportion with the score on K subtest. Finally, the impact of the D (2) variable increased the power to predict BPD diagnosis to 74% (R^2=.74, p=.020). As subscale D (2) scores increased, the likelihood of BPD diagnoses increased as well (β=-.083, OR=1.086).

The psychopathic deviate (Pd) subtest correctly classified the BPD group with 91.5% sensi-tivity. With the inclusion of the defensiveness (K) and depression (D) subtests, this sensitivity rate increased to 94%. The psychopathy subtest correctly classified the control group with 71% unique-ness. This rate rose to 74.2% with the inclusion of subtest K and to 77.4% with the inclusion of subtest D.

Data for the BPD with and without Comorbidity

The BPD group without comorbidity consisted of 44 (86%) females and 7 (14%) males. Of them, 10 (20%) were married, 39

(76%) were single, and 2 (4%) were divorced or separated. No sig-nificant differences by occupation, gender, and marital status were found between the BPD groups that did and did not have comorbidity. The mean age of the BPD group with co-morbidity was 24.86±6.37 years, and the mean age of the BPD group without comorbidity was 24.58±5.19 years. Of the BPD with comorbidity group, 23 (74%) were females, and 8 (16%) were males. Of them, 4 (13%) were married, 26 (84%) were single, and 1 (3%) was divorced or separated. Table 3 shows that the MMPI profiles of the BPD groups with and without comorbidity not significantly different. The group with-out comorbidity had higher scores on subtests F, Pt (7), Sc (8) and Si (0), but this difference was not statistically significant.

The MMPI T scores of six previous BPD studies that are referred to are shown in Table 4. All six studies recorded higher scores for subtests D (2), Pd (4) and Pt (7). Five had higher scores for sub-test Sc (8), and four had higher scores for subtests F and Pa (6). This study recorded higher scores for subtests 8, 2 and 3, but its T scores were lower than the values in the literature. Low scores on validity subtests K and L were found by all the studies.

Table 3. Comparison of non-comorbid and comorbid BPD patients' MMPI T scores

| Variables | Non-Comorbid (n=51) | | Comorbid (n=31) | | sd | t |
	Mean	Standard deviation	Mean	Standard deviation		
L-Lying	42.14	9.14	39.71	9.22	80	1.162
F-Abnormality	65.59	17.02	62.87	13.99	80	.748
K-Defensiveness	44.59	10.55	43.06	8.30	80	.685
Hypochondriasis	61.18	13.43	63.58	10.03	80	-.861
Depression	66.61	11.16	65.35	10.46	80	.505
Hysteria	65.41	13.01	68.94	9.64	80	-1.305
Psychopathic Deviate	69.80	11.35	71.00	10.16	80	-.481
Masculinity/Femininity	47.84	12.52	51.32	11.26	80	-1.267
Paranoia	65.00	13.24	63.81	10.11	80	.431
Psychasthenia	66.14	11.18	63.23	10.09	80	1.186
Schizophrenia	68.94	14.29	66.03	13.21	80	.919
Hypomania	61.78	10.96	64.71	10.69	80	-1.183
Social Introversion	59.10	12.36	55.84	11.30	80	1.195

*p<.05; **p<.01; ***p<.001.

Table 4. The mean MMPI scores of BPD patients from related studies

	This Study	Resnick et al. (1988)	Resnick et al. (1983)	Gustin et al. (1983)	Lloyd et al. (1983)	Synder et al. (1982)	Kroll et al. (1981)
L	41.2	44.6	56.0	44.0	48.0	46.2	48.0
F	64.6	66.3	69.4	85.0	73.0	85.9	84.0
K	44.1	46.9	47.5	46.0	46.0	44.8	47.0
Hs	62.1	56.0	52.1	68.0	70.0	74.6	62.0
D	66.1	73.3	72.4	89.0	75.0	85.6	82.0
Hy	66.7	62.6	59.5	70.5	73.0	68.3	70.0
PD	70.3	76.3	77.5	84.0	81.0	84.7	84.0
MF	49.2	53.8	58.4	68.0	60.0	68.4	60.0
PA	64.6	69.6	70.1	77.5	64.0	79.1	78.0
PT	65.1	71.1	71.0	89.0	78.0	85.6	74.0
SC	67.8	71.1	77.7	98.0	64.0	97.7	85.0
MA	62.9	60.8	63.5	70.5	70.0	71.7	65.0
PT	57.8	61.3	63.2	67.5	65.0	65.0	63.0

Discussion

This study investigated a unique MMPI profile pattern that distinguished BPD diagnosis, and found that there were statistically significant differences between the control group that did not have any psychiatric diagnosis and the group with BPD diagnosis. The highest MMPI scores were on sub-scales F, 4, 8, 3 and 2 in patients with and without comorbidity based on DSM IV second axis with no statistically significant differences between them BPD.

Many studies were conducted to describe a sensitive MMPI profile specific to BPD in the 1980s and 90s when BPD was especially highlighted and clinicians were invited to pay more attention to it.[31,33,36,42] The studies in this area have found higher scores in the BPD group on MMPI subtests FTS, F, 4, 6, 8 and sometimes 2. The study conducted by Gustin et al.[31] (1983) classified 78% of BPD patients correctly using discriminant analysis as well as MMPI subtests, and an MMPI profile study by Dereboy et al.[42] conducted with DSM III-R second axis b cluster PD patients classified BPD patients correctly at a rate of 78.8% BPD. A literature review by Gartner et al.[36] (1989) also reported that subtests 8, 4 and 2 were generally followed by subtests 6 and 7, and that most of these subtest scores were above 70 T. Abromowitz et al.[33] (1984) found a mean profile of 827 for a group of BPD patients who were diagnosed using the Diagnostic Interview for Borderlines. Resnick et al.[37] (1988) reported an elevation in the scores on subtests 4, 2, 8, 7 and 6. A study by Eren et al.[9] (2014) as-sessing psychosocial, symptomatic and diagnostic changes in the long-term psychodynamic psycho-therapy of the patients with a majority of BPD found that the highest scores in the MMPI profiles of the patients were F, 1 (Hs), 2 (D), 3 (Hy), Sc (8), K, 4 (Pd) and 6 (Pa). The code type 824 being com-mon to all studies can be interpreted as an indication of the coherence and validity of the BPD diagno-sis.[27–35]

This study investigated the MMPI profiles of the BPD patients. The study found that the sub-tests were consistent with the literature. However, the T values of the MMPI subtests in this study are lower than those reported in the literature. This may be related to socio-cultural factors and the severi-ty of the clinical picture. The causes of this decline can be examined by further comparative studies to determine whether family support, social and cultural factors have an effect on the subtests.

Statistically significant differences were found between the BPD group and the healthy control group (p<.001); however, there were no significant differences between the BPD and BPD with comorbidity groups. These findings indicate that the distinguishing quality of BPD diagnosis can be achieved by MMPI subtests in patients that do and do not have comorbidity.

The MMPI T scores in the six BPD studies analyzed within this research indicated that all of these studies involved higher scores for subtests D (2), 4 (Pp) and 7 (Pt). Five had higher scores for subtest Sc (8), and four had higher scores for subtests F and 6 (Pa).[27–31,38] Our study recorded higher scores on subtests 4, 8, 2 and 3. Low scores on validity subtests K and L, and high scores on subtest F were recorded by all the studies. In terms of the highest subtests, there was a remarkable increase in scores on subtests Pd (4), Sc (8), and Hy (3) between the BPD and control groups.

This study found no statistical difference between BPD and control groups regarding the fre-quency of observing ratios of double and triple code types. Widiger et al. (1986) found the 824 code in 41% of a BPD sample with 57% sensitivity and 85% specifity, but it has been reported that when the patients with antisocial PD diagnosis were excluded from this sample, the proportion of this type of code was lower, and this pattern was also accompanied by the Pa (6) and Pt (7) subscales.[43] The MMPI profiles of BPD patients tend to show high values in a large proportion of clinical subtests. Of 12 studies that

recorded mean BPD profiles, one recorded scores over 70 T on four out of nine clinical subtests,[32] three did so on five subtests,[30,39] four did so on six subtests, and three did so on seven subtests.[29,34,35] Finally, one of these studies reported that the mean BPD profile was above 70 T on eight clinical scales.[31] Thus, a typical finding is that the MMPI profiles of BPD patients are above normal values in six clinical subtests out of nine. In our study, a statistical difference was found be-tween BPD and control group in terms of the floating profile. The BPD group had a floating profile at a rate of 57%.

This study used logistic regression to determine the extent to which MMPI subtests predicted the individuals in patient and control groups, and found that subtest Pd (4) differentiates cases with and without BPD at 60%. With the addition of subtest K, this predictability rises to 70%, and with subtest D (2), the explanatory power of the equation increases to 74%.

According to these results, Pd (4) is a subtest with antisocial components. These individuals have difficulties in interpersonal relationships, impulsiveness, hot-temper, low anxiety tolerance, prob-lems with the law, and inability to estimate and anticipate the consequences of their behaviors despite having high intelligence. In this study, the BPD group's highest score was on subtest Pd (4). The in-creases in subtest Pd scores have also been reported in the literature.[36] BPD patients' subtest Pd scores are remarkably higher than those of patients with chronic and acute schizophrenia,[34,39] dysthymic disorder,[28] other personality disorders,[31] non-borderline in-patients,[27] non-borderline outpatients[29] and control groups with no psychiatric diagnosis.[29,39]

In this study, the BPD patients had the second highest score on subtest Sc (8). In all the MMPI studies performed with BPD patients, the T values on subscale Sc (8) were 70 or higher.[25,27–35,39] BPD patients had higher scores on subtest Sc (8) than individuals with no psychiatric diagnoses, others with PD,[29–31,38] dysthymic disorder,[28,38] mixed inpatient groups[27,35,38] and mixed outpatient groups.[29,35] However, some studies have reported that BPD patients' scores on subtests Sc, Pa, and F are indistinguishable from those of schizophrenics.[34] Nevertheless, it has been reported that the T values of schizophrenia patients are higher, and that schizotypal PD patients have higher scores than BPD patients on subtest Sc.[39]

In this study, subscale D (2) had fourth highest scores. In the literature, the third highest subtest score in the MMPI profiles of BPD patients is typically seen as a depression subtest.[27,30,32,34,35] The majority of MMPI studies in the literature have recorded high scores for subtest D.[25,27,29–35,38,39]

In this study, subtest Hy (3) had the third highest scores. This result differs from the literature. Most studies have recorded values above 65 T for subtest Hy,[25] but it had a lower rank among the highest subtest scores in this study. Depression, which is the third highest subtest in the literature, being at a lower rank among the T scores of subtests and the higher rank of hysteria may be related to the presence of moderate symptoms and cultural factors.

In this study, higher scores were obtained on subscales F, 7, 8 and 0 by the BPD group, but without a statistically significant difference, which indicates that these patients were more inclined to atypical, incompatible responses (F), have unique perception and way of thinking, social isolation Si (0), and fear, anxiety and obsessive thoughts Pt (7). The personality traits of patients with comorbidity may lead to higher and lower scores on different subtests due to their overlap with the characteristics of BPD and other PD diagnoses, and may only differ from BPD patients. This subject should be stud-ied with larger samples in further research.

Another result of this research is that subtests K and L, two of the validity subtests which are important discriminating factors in BPD diagnosis, had low values (<45 T), while subtest F had high values. Together, they form an inverted V on a graph. Many studies have shown that the validity scales of MMPI are sensitive to BPD diagnosis.[27,29,31–36,38,39] Subtest F can be seen as a measure of social desirability because the majority of normal people respond in a similar way, and the score of this test being high in individuals with BPD can be in-terpreted as these individuals' insufficiency in evaluating so-cial desirability. High subtest F scores may also be associated with negative and unusual behavior patterns created by non-cooperation, being socially undesirable. Validity subtests K and L measure attitudes toward the test. Subtest L measures obvious lying and unskillful efforts to appear normal, while subtest K measures the tendency to minimize pathology. The BPD patients score low on subtests K and L, along with a general tendency to emphasize their symptoms (pathology), so that the three validity subtests typically exhibit a sharp in-verted V shape.

Some interpretations of these validity subtests have emerged in the foreground in the litera-ture.[36] One emphasizes that the extreme high scores on subtest F may be related to a common patho-logical factor among patients with poly-symptomatic BPD. The more specific explanation is that these scores usually indicate thought disorder. The final interpretation suggests that high subtest F scores accompanied with low scores on subtests L and K are a sign of BPD patients' exaggerated and dra-matic expression of their BPD difficulties.

Conclusion

This study examines the Minnesota Multiphasic Personality Inventory profile characteristics of BPD and comorbid BPD patients. Statistical analyses of the BPD group and the control group found significant differences (p<.01, p<.001).

It is notable that MMPI profiles of BPD patients tend to have high values in a large part of the clinical subtests. The patients' highest scores were on subtests 4, 8, 3 and 2. This result is similar to the literature. However, it is noteworthy that the T values of the subtests that were higher in this study were lower in the literature. Another result of this study is that the BPD group obtained lower score on subtests K and L (<45T) and high val-

ues in the F subtest, as seen in the literature, and showed floating profile characteristics with the other subtests.

When examined at which rate the MMPI subtests predicts the individuals in patient and the control group using logistic regression, subtest Pd (4) appears to distinguish the cases with and without BPD at a rate of 60%. With subtest K, this predictability rises to 70%. With subtest D (2), the explana-tory power of the equation rises to 74%.

There were no statistically significant differences between the BPD group and the BPD with comorbidity in terms of mean profile, increasing subtests and code types. However, although not sta-tistically significant, higher scores were obtained on subtests F, Pt (7), Sc (8) and Si (0) by the non-comorbid group than by the comorbid group. This result may have been due to the relatively small number of patients with comorbidity. New studies with larger samples are needed to clarify this.

The results of this study show that MMPI will provide important and reliable contributions to this area, given the need for effective, systematic and objective testing methods that facilitate under-standing the diagnosis, treatment and study of BPD patients. In many studies, mental health workers have described BPD patients as the patients with who they have most difficulty with due to their mul-tiple diagnoses, impulsive behaviors, suicide attempts, self-injurious behaviors, and varying attitudes in relationships. Mental health workers have also described these patients as inexplicable and are re-luctant to give care to them.[11,44] MMPI profiles will help mental health workers that work with BPD patients to develop appropriate strategies by contributing to their understanding of BPD patients' cur-rent and potential responses and behavior patterns, especially nurses who spend the most time with these patients in inpatient services. They will be able to benefit from this test in their clinical practice.

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