



ARAŞTIRMA / RESEARCH

Psychological profile and personal traits in patients with vestibular dysfunction

Vestibüler disfonksiyonlu hastalarda psikolojik profil ve kişilik özellikleri

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Abstract

Purpose: The aim of this study is to evaluate the psychological profile and personality traits of patients with vestibular dysfunction (VD).

Materials and Methods: A total of 452 participants, 225 patients with VD and 227 control subjects who had no complaints of VD, were included in the study. Otorhinolaryngologic examination and vestibular assessment were performed. The Dizziness Handicap Inventory (DHI) was completed by the patients to determine the handicap and the severity caused by dizziness. The psychological aspects of the patients were assessed using the Eysenck Personality Questionnaire-Revised Abbreviated form (EPQR-A), Type D personality scale (DS-14), and the Hospital Anxiety and Depression Scale (HADS).

Results: Of the 452 participants, 157 (69.8%) were female and 68 (30.2%) were male, while, of the control subjects, 133 (58.6%) were female and 94 (41.4%) were male. It was found that 81 (36%) patients and 42 (18.2%) control subjects had received psychiatric treatment. The EPQR-A neuroticism subscale and the anxiety and depression subscale of the HADS were statistically significantly higher in the patients. The negative emotions and social suppression subscales of the DS-14 were statistically significantly higher in the patients.

Conclusion: This study revealed that neurotic personality traits and type D personality were higher in patients with VD. Thus, we believe that the psychological profile and personality traits of patients complaining of vestibular diseases are important in diagnosis and treatment.

Key words: Vestibular dysfunction, anxiety, depression, neuroticism, type D personality.

Öz

Amaç: Bu çalışmada, vestibüler disfonksiyonlu hastaların, psikolojik profil ve kişilik özelliklerini değerlendirmeyi amaçlanmıştır.

Gereç ve Yöntem: Vestibüler disfonksiyon şikayeti olan 225 hasta ve vestibüler disfonksiyon şikayeti olmayan 227 kontrol olmak üzere toplam 452 kişi çalışmaya alındı. Otorinolaringolojik muayene ve vestibüler değerlendirme yapıldı. Baş dönmesinin yol açtığı özür ve şiddeti belirlemek için Dizziness Handicap İndeksi (DHI) formu hastalar tarafından dolduruldu. Hasta ve kontrol grubuna, Eysenck Personality Questionnaire-Revised Abbreviated (EPQR-A), Type D personality scale (DS-14) ve Hospital Anxiety Depression Scale (HADS) formları dolduruldu.

Bulgular: Hastaların 157'si (%69.8) kadın, 68'i (%30.2) erkek, kontrollerin 133'ü (%58.6) kadın, 94'ü (%41.4) erkek idi. Hasta ve kontrol grubunda ortalama yaş 39.72±14.08 ve 35.02±11.80 idi. Hastaların 81'inin (%36), kontrollerin 42'sinin (%18.4) psikiyatrik tedavi aldığı saptandı. EPQR-A, nevrozizm alt ölçeği, vertigolu hastalarda kontrol grubuna göre istatistiksel olarak anlamlı düzeyde daha yüksek bulundu. HADS'ın anksiyete ve depression alt ölçeği, vertigolu hastalarda kontrol grubuna göre daha yüksek ve istatistiksel olarak anlamlı bulundu. DS 14'ün, negative emotions and social suppression alt ölçekleri, vertigolu hastalarda kontrol grubuna göre daha yüksek ve istatistiksel olarak anlamlı olarak bulundu.

Sonuç: Bu çalışma, vestibüler disfonksiyonlu hastalarda "nevrozik" kişilik özelliklerinin ve Tip D kişiliğinin daha yüksek oranda olduğunu gösterdi. Sonuç olarak, vestibüler hastalıklardan şikayet eden hastaların psikolojik profil ve kişilik özelliklerinin, tanı ve tedavide önemli olduğunu düşünmekteyiz.

Anahtar kelimeler: Vestibüler disfonksiyon, anksiyete, depresyon, nevrozizm, Tip D kişilik

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INTRODUCTION

Vertigo is an illusionary sensation of movement frequently accompanied by great discomfort and distressing vegetative reactions. The dizziness caused by vestibular dysfunction (VD) involves psychological reactions, and the dizziness and vertigo associated with VD are common motivations for medical consultation. Although seen at all ages, the prevalence of VD increases with aging and is more common in women (7%) than in men (3%)¹. Many organ-related diseases (cardiovascular, central neurological, and peripheral vestibular systems) can manifest themselves with VD. VD is connected with body-related symptoms that affect from 20% to 56% of the general population^{2,3,4}. Therefore, it is often difficult to establish the etiologic problems in patients with VD who do not show evidence of objective symptoms.

Psychiatric disorders are common in patients complaining of VD^{5,6}. In particular, anxiety and mood disorders are the most common and are involved in up to 50% of all dizziness states, and psychiatric disorders appear to exert an important influence on the course of the illness⁷. Studies have shown that irritable bowel syndrome and fibromyalgia are common in people with anxiety and depression; similarly, non-cardiac chest pain is more common in persons with neuroticism^{8,9,10,11}. Based on the psychiatric disorders accompanying organic diseases, it may be possible to identify the psychiatric disorders underlying VD, which is a symptomatologic finding, or, at least, to suspect these diseases in differential diagnosis. In addition, although the severity and duration of symptoms vary depending on organic causes, the nature of the individual's perception of dizziness may differ based on the personality traits of the individual and the anxiety due to recurrent symptoms¹².

This investigation may have a role in the definition of VD, including the presence of psychological symptoms and personality traits that may differentiate it from other neurotologic disorders. VD may be an integral part of several psychiatric syndromes, including anxiety, somatoform, and depressive disorders. However, VD is difficult to describe in most cases. Therefore, in the current study, we attempted to determine the sociodemographic characteristics, etiology, clinical approach, psychological profiles, and personality

traits of patients with complaints of VD.

MATERIALS AND METHODS

Study setting and subjects

A total of 225 patients and 227 control subjects who were admitted to the ear, nose, and throat clinic with a complaint of VD were included in the study. The study design was reviewed and approved by the local ethics committee (protocol: 71/2016). The control group consisted of persons who had no previous complaints of VD and who came to the clinic for examination. The patients were informed that some of the collected data would be used for research purposes, and they gave their written informed consent to participate. A questionnaire was completed by the patients and collected before they saw the specialist in order to keep the specialist blinded. Patients who presented to the outpatient clinic were given the Dizziness Handicap Inventory (DHI), Eysenck Personality Questionnaire-Revised Abbreviated form (EPQR-A), Type D personality scale (DS-14), and Hospital Anxiety Depression Scale (HADS), and they were then asked to complete the questionnaire. Next, the patients were seen by the physician and underwent a routine history interview and multidisciplinary clinical evaluations, including a neurologic examination, vestibular laboratory testing, head imaging, and other investigations. The vestibular physical examination included the following: appearance of spontaneous and gaze nystagmus, Romberg test, standard walk, tandem walk, and head shake nystagmus. The tests were performed with Frenzel lenses. The spontaneous and gaze nystagmus tests were defined as pathological in the presence of any detectable nystagmus. The Romberg test was defined as pathological if the subject opened his or her eyes or moved the legs during the closed eyes part of the test. Dix-Hallpike and head impulse tests were included in the vestibular physical examination. Following the examinations, diagnoses were added to the forms of the patients who could be diagnosed.

VD patients were divided into three groups: peripheral causes, central causes, and other causes. Peripheral causes were defined as benign paroxysmal positional vertigo (BPPV), Ménière's disease, vestibular neuritis, labyrinthitis, and other peripheral vestibular. Other peripheral vestibular included canal dehiscence, hypoactive labyrinth,

sensorineural hearing loss, eustachian tube dysfunction, and otosclerosis. Central causes included motion sickness, vestibular migraine, transient ischemic attack, trauma, and other central causes. Other causes were defined for the patients who did not report a peripheral or central cause for dizziness. They included autonomic/orthostasis, cerebrovascular disease, conversion disorder, neuropathy, lupus, sinusitis, tinnitus, etc. In this study, cerebrovascular disease referred to chronic small vessel disease and imbalance, and not a focal or acute stroke. We classified VDs as spinning, swaying, orthostatic, and incomplete so that patients could subjectively define their VDs.

Patients who did not wish to participate in the study and those who had not filled out the forms completely were excluded from the study. If patients had comorbid diagnoses, they were not included in the analysis. Exclusion criteria included patients with histories of malignancy and metabolic, cardiovascular, and endocrine disorders. For these reasons, 42 patients were excluded from the study.

Assessment tools

Sociodemographic data form

This form developed by researchers was used to obtain demographic and organizational characteristics, such as age, gender, marital status, and occupation.

DHI

The DHI is a survey consisting of 25 questions and indicates physical, emotional, and functional handicaps depending on dizziness and balance problems in patients¹³. Questions 1, 4, 8, 11, 13, 17, and 25 have been structured to measure the physical handicap; questions 2, 9, 10, 15, 18, 20, 21, 22, and 23 measure the emotional handicap; and questions 3, 5, 6, 7, 12, 14, 16, 19, and 24 measure the functional handicap. Each question consists of yes (4 points), no (0 points), and sometimes (2 points) answers. In scoring the subscales of this inventory, 28 points have been recommended as a limit to determine physical handicap and 36 points to determine functional and emotional handicaps. High scores are considered as those which indicate that the patients' complaints of dizziness severely handicap their QOL. The reliability and validity of the scale in Turkey has been established by Canbal et al¹⁴.

EPQR-A

The EPQR-A measures the personality profiles of

various psychiatric patient groups and healthy individuals. It consists of a total of 24 items distributed across four subscales containing six items each. The "neuroticism/stability" trait was used to assess the stability of emotion; the "extraversion/introversion" trait was used to assess the tendency of extraversion and introversion; the "psychoticism/socialization" trait was used to assess the subject's psychiatric characteristics; and "lie" was used as the validity scale¹⁵. The participant is required to quickly respond "Yes" or "No" to each question. Responses of "Yes" are scored as 1, and responses of "No" are scored as 0; each subscale is rated from 0 to 6 points. This measure was developed by Francis et al.¹⁵ and adapted to Turkish by Karanci et al¹⁶; its validity and reliability were demonstrated by the same authors.

DS-14

This questionnaire aims to determine Type D personality traits in individuals. The DS-14, developed by Denollet et al.¹⁷, is a 5-grade Likert-type scale (0–4 points) ranging from "False" to "True" and consists of a total of 14 items. The scale has two sub-dimensions of negative emotions and social inhibition scored by the first and last seven items, respectively, with a total score of 0 to 28 for each sub-dimension. A score of 10 or more on a sub-dimension indicates the presence of Type D personality traits. The reliability and validity of the scale in Turkey has been established by Alcelik et al¹⁸.

HADS

The HADS is a self-reported questionnaire used for hospital outpatients in medical or surgical departments to assess anxiety and depression as two dimensions. It contains 14 items, seven for anxiety and seven for depression. Each item is evaluated on a 4-point scale. The total scores can range from 0 to 21 for both anxiety and depression; a higher score indicates a more intense negative affect. The validation and reliability studies of the HADS were developed by Zigmond and Snaith¹⁹. The Turkish version of HAD was validated by Aydemir et al²⁰.

Statistical analysis

The normality of data was evaluated by the Kolmogorov-Smirnov test. The Mann-Whitney *U* test was used to compare the groups in terms of non-normally distributed variables. Statistical parameters are expressed as median (Min-Max),

whereas statistical parameters of normally distributed variables are expressed as mean \pm SD. Differences in the distribution of categorical variables were examined with the chi-square test. The statistical significance level was set at $p < 0.05$. The validity and reliability of the scales used in the research were obtained by Cronbach's alpha coefficient. Statistical analysis of the data was performed using the SPSS Statistics version 22 for Windows (IBM Corporation, Armonk, NY, USA).

RESULTS

Of all patients, 157 (69.8%) were female and 68 (30.2%) were male, while 133 (58.6%) of the control subjects were female and 94 (41.4%) were male. The mean ages of the patient and control groups were 39.72 ± 14.08 years and 35.02 ± 11.80 years, respectively. The sociodemographic characteristics of the patient groups are shown in Table 1. A total of 169 (75.1%) of the patients were married, and 46 (20.4%) of the patients were single; 10 (4.4%)

patients were divorced, whereas 159 (69.7%) members of the control group were married, 66 (28.9%) were single, and 3 (1.3%) were divorced. All of the patients had been admitted to the outpatient clinic with a complaint of VD with multiple episodes.

A total of 81 (36%) patients and 42 (18.4%) control subjects had received or were currently receiving psychiatric treatment. Etiologically, 158 cases (70.2%) had peripheral, 10 cases (4.4%) had central, and 57 cases (25.3%) had other causes. Eighty-eight patients (39.3%) defined their VDs as orthostatic, 39 (17.4%) as spinning, 58 (25.9%) as swaying, and 39 (17.4%) as incomplete vertigo. All the scales were shown to be reliable according to the Cronbach's alpha coefficients of the scales. The Cronbach's alpha coefficients, for internal consistency, were 0.861 for the DS-14, 0.773 for the HADS, and 0.553–0.70 for the EPQR-A (subscales). The control group value was not calculated because the DHI scale was applied only to the individuals in the patient group.

Table 1. Vertigo features and socio-demographic data of groups

		Patient group		Control group	
		n	%	n	%
Age	(Mean \pm SD) years	39.72 \pm 14.08		35.02 \pm 11.80	
Gender	Female	157	69.8	133	58.6
	Male	68	30.2	94	41.4
Marital Status	Married	169	75.1	159	69.7
	Single	46	20.4	66	28.9
	Divorced	10	4.4	3	1.3
Psychiatric treatment	Yes	81	36.0	42	18.4
Diagnosis	Vertigo	144	64.0	-	-
	Dizziness	81	36.0	-	-
Cause of vertigo	Central	10	4.4	-	-
	Peripheral	158	70.2	-	-
	Others	57	25.3	-	-
Type of vertigo	Spinning	39	17.4		
	Swaying	58	25.9		
	Ortostatic	88	39.3		
	Incomplete	39	17.4		

SD: Standard deviation

The DHI distribution of patients is shown in Table 2. The total score was calculated as 47.52 ± 23.57 in patients with the sum of 15.83 ± 7.00 points as physical, 12.36 ± 8.95 points as emotional, and 19.36 ± 10.42 points as functional. Based on these results, we found that patients were more likely to suffer from functional loss and that vertigo was a moderate handicap to their QOL. There was a

strong positive correlation between the patient and control groups in the EPQR-A neurotic subscale ($p < 0.001$), and the scores in the patient group were significantly higher compared to those in the control group (Table 3). The extraversion, lie, and psychoticism subscales were not statistically significant ($p = 0.720$, $p = 0.290$, $p = 0.418$, respectively). According to the DS-14, both

subscales (negative emotions and social inhibition) were significantly higher in patient group ($p < 0.001$) (Table 3).

Table 2. Subscale of Dizziness Handicap Inventory

DHI	Mean±SD
Physical	15.83±7.00
Emotional	12.36±8.95
Functional	19.36±10.42
Total	47.52±23.57

DHI: Dizziness Handicap Inventory, SD: Standard deviation

According to the HADS scale, both the anxiety and depression subscales showed strong a correlation and statistical significance in the patient group ($p < 0.001$) (Table 3). When we considered the correlations among all scales, we observed that the anxiety, depression, negative affectivity, and social inhibition subscales were significantly higher than the non-anxiety, non-depression, non-negative affectivity, and non-social inhibition subscales (Table 4).

Table 3. Comparison of groups for scales

Scale		Group		p
		Study (n:225)	Control (n:228)	
		Median (Min-Max)	Median (Min-Max)	
HAD	Extraversion	4.00(0.00-14.00)	4.00(0.00-6.00)	0.720
	Lie	5.00(0.00-6.00)	5.00(0.00-6.00)	0.290
	Neuroticism	4.00(0.00-6.00)	3.00(0.00-6.00)	0.001*
	Psychoticism	1.00(0.00-7.00)	1.00(0.00-5.00)	0.418
HAD	Anxiety	9.00(0.00-37.00)	7.00(0.00-25.00)	0.001*
	Depression	9.00(0.00-31.00)	6.00(0.00-16.00)	0.001*
DS 14	Negative Affectivity	14.00(0.00-35.00)	9.00(0.00-28.00)	0.001*
	Social Inhibition	10.00(0.00-27.00)	8.00(0.00-24.00)	0.016*
	Total	24.00(0.00-55.00)	16.00(0.00-52.00)	0.001*

HAD: Hospital Anxiety and Depression, DS-14: Type D personality scale; Mann-Whitney U test; $\alpha:0,05$

*Difference is statistically significant; Min-Max: Minimum-Maximum

Table 4. Distribution of groups for anxiety, depression, negative affectivity and social inhibition

		Group				p
		Study (n:225)		Control(n:228)		
		n	%	n	%	
Anxiety	Non Anxiety	123	54.7	165	72.4	p<0.001*
	Anxiety	102	45.3	63	27.6	
Depression	Non depression	78	34.7	120	52.9	p<0.001*
	Depression	147	65.3	107	47.1	
Negative Affectivity	Non Negative Affectivity	65	29.0	129	56.8	p<0.001*
	Negative Affectivity	159	71.0	98	43.2	
Social Inhibition	Non Social Inhibition	105	46.9	142	62.6	p<0.001*
	Social Inhibition	119	53.1	85	37.4	

Chi-Square test; $\alpha:0,05$; *Difference of distribution is statistically significant

Table 5. Distribution of anxiety, depression, negative affectivity and social inhibition according to DHI

		DHI						p
		Mild(n:59)		Moderate(n:89)		Severe(n:70)		
		n	%	n	%	n	%	
Anxiety	Non Anxiety	38	64.4	49	55.1	32	45.7	0.104
	Anxiety	21	35.6	40	44.9	38	54.3	
Depression	Non depression	28	47.5	30	33.7	18	25.7	0.034*
	Depression	31	52.5	59	66.3	52	74.3	
Negative Affectivity	Non Negative Affectivity	25	42.4	22	24.7	16	22.9	0.027*
	Negative Affectivity	34	57.6	67	75.3	54	77.1	
Social Inhibition	Non Social Inhibition	31	52.5	36	40.4	34	48.6	0.317
	Social Inhibition	28	47.5	53	59.6	36	51.4	

DHI: Dizziness Handicap Inventory, Chi-Square Test; $\alpha:0.05$; * Difference of distribution is statistically significant

Distribution of the EPQR-A, HADS, and DS-14 between the patient and control groups is shown in table 3. When we examined the patient distribution according to the DHI index, depression and negative affectivity were statistically significant ($p = 0.034$, $p = 0.027$, respectively) (Table 5). The distribution of EPQR-A, HADS, and DS-14, and the subscales according to DHI distribution are shown in table 5.

DISCUSSION

A significant number of patients require medical treatment and are exposed to daily activity and job loss due to VD. Some of the patients may have more than one episode per year. In fact, 47.1% of the patients in this study had multiple vertigo attacks. A screening study reported a lifetime prevalence of 7% for women and 3% for men requiring a medical consultation for vertigo²¹. Consistent with the studies performed, the majority of our patient group consisted of female patients (69.8%). The distinction between peripheral and nonperipheral etiologies plays an important role in the diagnosis and treatment of vertigo patients. In their wide field study, Muelleman et al.²² found 57.7% peripheral and 42.3% nonperipheral etiologies. In addition, they diagnosed patients with Ménière's disease (23.0%), vestibular migraine (19.3%), BPPV (19.1%), and central origin nonmigraine (16.4%). In our study, we found more peripheral causes (70.2%) than central (4.4%) and other causes (25.3%). In a study conducted on students, orthostatic dizziness was found in 52.0%, spinning vertigo in 11.6%, swaying vertigo in 12.2%, and unspecified dizziness in 15.2%²³. Dizziness, swaying, and spinning vertigo have been reported to be associated with migraine headaches²⁴. In our study, we found orthostatic vertigo in 88 (39.3%), spinning in 39 (17.4%), swaying in 58 (25.9%), and incomplete in 39 (17.4%) patients. Based on these results, we can say that, considering personality traits, the type of vertigo commonly described by these patients was compatible with orthostatic vertigo.

The DHI is widely used in patients with peripheral and central vestibular pathologies, traumatic cerebral damage, and progressing head/neck trauma, and it is used to determine the effect of subjective vertigo on the QOL in cases of major anxiety¹³. This inventory was developed by Jacobson and Newman¹³.

Handicaps that occur in physical, emotional, and functional areas should be revealed in order to determine the effects of vertigo or dizziness on an individual's QOL²⁵. In our study, patients with vertigo complaints had a moderately impaired QOL according to the DHI index. Furthermore, depression and negative emotions were higher in the patient group according to the DHI. Thus, we believe that patients with detected moderate physical, emotional, and functional losses should be considered likely to have a Type D personality.

Neuroticism is a unique predictor of widespread psychiatric conditions. It is considered a sign of vulnerability²⁶. Neuroticism or emotionality is characterized by high levels of negative affects, such as depression and anxiety. According to Eysenck's theory, neurotic people with a low threshold of activation, who cannot inhibit or control their emotional reactions and have negative affects as a result of very small stresses (fight or flight), can become easily stressed or nervous. Inward-oriented people are chronically over-stimulated and stressed. Therefore, they need peace and quiet by pulling down their performances²⁷. In our study, the patient group had significantly higher levels of neuroticism than the control group. In addition, considering the correlation between the DHI and the EPQR-A test, we found that vertigo patients were physically, emotionally, and functionally compatible with the nature of a neurotic personality in each category. According to this result, in some of the patients with VD, we can associate the symptom of vertigo with the externalization of the person as a protective factor.

Anxiety in a patient may be the cause of dizziness, but it may also be a direct consequence of an underlying vestibular disorder. Alternatively, a patient's dizziness and anxiety may be two different symptoms of a common underlying disorder. Anatomical and physiological evidence revealed the neurological basis that could explain the close relationship between balance disorders and anxiety²⁸. Monoaminergic effects on these central routes and pathways indicate a biological basis for the co-emergence of balance disorders and anxiety. Therefore, it is believed that anxiety is more likely to cause a vestibular disorder. In our study, anxiety and depression parameters were significantly higher in the patient group. In addition, according to the DHI, anxiety and depression caused physical, emotional, and functional handicaps in patients.

Although various rates have been reported by different studies, psychogenic complaints, such as anxiety and depression, are frequently reported in patients with dizziness^{29,30}. Garcia et al.³¹ found an anxiety disorder in 64% of patients with vertigo and imbalance. Kurre et al.³² found an anxiety disorder in 14% to 24% of vertigo patients. On the other hand, persistent postural-perceptual dizziness (PPPD) is one of the most common causes of chronic dizziness. PPPD has now been included by the World Health Organization (WHO) in its draft list to be part of the upcoming International Classification of Diseases in 2018. Objective tests to prove the diagnosis of PPPD do not exist. For this reason, we cannot use the subcategories of PPPD in our patient group.

The Type D (distressed) personality is defined as one wherein there is the co-existence of negative emotions and social inhibition³³. The prevalence of Type D personality varies from 5.3% to 53% in various clinical cases^{33,34}. In recent studies, Type D personality was seen as an important indicator of adverse clinical outcomes in patients with cardiac disease, chronic pain, and asthma^{35,36,37}. Bartels et al.³⁶ found that tinnitus patients were clinically neurotic and had negative affection and social handicaps and that they were outward-oriented with a lower emotional stability. Our results were compatible with the study performed by Bartels et al.³⁶ with Type D personality traits being higher (71%) in our patient group. The most crucial point of our study was that vertigo patients had a negative affection. While we cannot fully explain whether this high affection level was a cause or a consequence, we believe that these questions will be answered by further studies.

In various studies, the prevalence of vertigo patients with mental factors that have been thought to play a role in the etiology ranges from 20% to 50%³⁸. In the medical literature, the terms “psychogenic dizziness” or “psychogenic vertigo” are used for such patients. Psychiatric dizziness, by definition, is certainly accompanied by other psychiatric symptoms. In these patients, there is no organic neurotologic disorder to explain the dizziness, or the vestibular test abnormalities detected are minor or irrelevant to the dizziness³⁸. According to the results of our study, we think that the psychogenic background of vertigo should be kept in mind for patients in whom no organic cause can be established and that cooperation with the psychiatric

outpatient clinic is necessary in these cases.

In this study, we found a correlation among the DHI, personality traits, and the psychological profile. Neuroticism and Type D character temperament were higher especially in VD patients, and anxiety and depression were also higher in these patients. This study showed that psychosomatic disorders are too common to be underestimated in VD patients. It goes without question that patients with organic vertigo syndromes have additional psychiatric disorders. We believe that taking the personality traits of patients into consideration when determining the diagnosis is important in clinical practice and research.

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