

## Pain catastrophizing in patients with primary dysmenorrhea: Its relationship with temperament traits and impulsivity

Pain catastrophizing in patients with primary dysmenorrhea

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### Abstract

**Aim:** The objective of this study was to evaluate the relationship between clinical pain and pain catastrophizing (PC) cognition in primary dysmenorrhea (PD). Moreover, this study evaluates the effects of temperament characteristics and impulsivity levels on PC.

**Material and Methods:** In this study, 258 patients who were diagnosed with PD and met the inclusion criteria were included. According to the Andersch and Milsom Scale, the patients were divided into two groups. Group 1 consisted of those whose functionality was impaired at moderate and severe levels due to pain, whereas Group 2 consisted of those whose functionality was not impaired at all and those who are mildly affected. Socio-demographic data form and the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire, Pain Catastrophizing Scale, and the Short Form of Barratt Impulsiveness Scale were applied to all patients.

**Results:** The functionality of patients with PD was significantly impaired by 53.1%, and the main symptom determining functionality was pain. The total and subscale PCS score averages in Group 1 were significantly higher than those in Group 2. Cyclothymic temperament and impulsivity explained 20% of the variance on PC.

**Discussion:** Psychological factors have an important role in managing PD. For this reason, both gynecological and psychiatric evaluations of patients with PD during treatment and the multidisciplinary treatment approach to be applied when necessary will improve the patients' quality of life and help them easily cope with symptoms.

### Keywords

Primary Dysmenorrhea; Pain Catastrophizing; Temperament; Impulsivity

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## Introduction

Primary dysmenorrhea (PD) is a gynecological problem that develops without organic pathology and is common in young women. Its most basic symptom is abdominal pain, which occurs with the onset of menstrual bleeding and continues for 2–3 days. Pain is mostly localized in the suprapubic region, but can spread to the waist and lower legs. The severity of pain varies among women and has intermittent and spasmodic characteristics [1]. In addition, physical and mental complaints can accompany the pain. PD is considered a public health problem, as its symptoms disrupt a person's functionality in work, school, and social areas and cause economic losses [2].

The most important symptom determining functionality in dysmenorrhea is pain. Pain perception, which is a subjective concept, depends on biopsychosocial factors, and mutual interactions between these factors exist [2]. In the literature, psychiatric disorders frequently accompany dysmenorrhea. According to these studies, mental complaints increase patients' sensitivity to their bodily sensations and make them perceive their somatic complaints more negatively [3]. Somatic complaints recurring in each menstrual period can create a feeling of helplessness, causing deterioration in perception of pain, and may cause pain catastrophizing (PC) [4]. The concept of PC, which contains negative pain cognition, such as terrible and unbearable pain, is an expression of mental strain in chronic painful diseases [5] and is considered an important factor in determining the prognosis of PD [6].

Studies examining the type of personality of patients with dysmenorrhea have revealed that neurotic personality traits are more pronounced in these patients [7,8]. In addition, according to these studies, personality traits are effective in influencing an individual's perception and management of pain in chronic painful diseases. Moreover, a neurotic personality characterized by a predisposition to experiencing negative emotions, emotional imbalance, and failure in interpersonal relationships comes to the fore [9,10]. Goubert et al. (2004) have determined that people with neurotic characteristics perceive pain as a threat, catastrophize pain, and, therefore, have difficulty managing the pain. The same study has revealed that neuroticism is the intermediary factor between the severity of pain and PC [11].

In the literature, studies have examined the personality characteristics of patients with dysmenorrhea. However, no studies have focused on temperament characteristics and examined the effect of temperament on pain. Similarly, no studies have assessed the level of PC in patients with PD. Thus, this study examined the relationship between clinical pain and PC cognition that is common in PD. Furthermore, this study evaluated the effects of temperament characteristics and impulsivity levels on PC.

## Material and Methods

### *Participants and study design*

This was a cross-sectional and descriptive study. The research group was composed of patients who applied to a University Hospital, Obstetrics and Gynecology Clinic between February 2018 and March 2019 and presented with severe menstrual pain. The study included women diagnosed with PD, aged

between 18 and 45 years, and volunteered to participate in the study. Patients diagnosed with secondary dysmenorrhea, those with a history of psychiatric illness, those with any disease that may be related to pain, those who have any impediment in filling the scale forms used in the study because of any physical or mental disorder, and those who did not complete the scale forms and did not sign the informed consent form were excluded from this study.

Two hundred fifty-eight patients were finally enrolled in this study and divided into two groups according to their level of functionality using the Andersch and Milsom Scale [12]. Group 1 included patients whose functionality was moderately (grade 2) or severely (grade 3) affected by dysmenorrhea, and Group 2 consisted of those whose functionality was not affected at all (grade 0), and those who were rarely affected (grade 1). Participants in both groups were asked to complete the prepared scale forms after completing the necessary medical procedures. In this study, we used a sociodemographic data form and the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire (TEMPS-A), Pain Catastrophizing Scale (PCS), and the Short Form of Barratt Impulsiveness Scale (BIS-11-SF). The study was conducted according to Helsinki Declaration. We obtained necessary permits for this study from KTO Karatay University's Ethics Board of Drug and Non-Medical Device Researches (26.12.2017; no: 2017/008).

### *Measurements*

Socio-demographic data form; The form has been prepared by the authors. The form included open-ended questions on participants' age, years of education, occupation, marital status, and general health status.

Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire (TEMPS-A); The scale was developed by Akiskal (1996) to evaluate the dominant affective temperament in individuals [13]. The scale, which is based on self-notification has five subdimensions: depressive, hyperthymic, irritable, cyclothymic, and anxious temperament. Validity and reliability studies on the Turkish version of the scale were conducted by Vahip et al. (2005) [14], which have reported a reliability, calculated separately for each temperament characteristic, between 0.73 and 0.93 and Cronbach's alpha between 0.77 and 0.85.

Pain Catastrophizing Scale (PCS); The scale was developed by Sullivan et al. (1995) to determine the level of catastrophizing associated with the feelings and thoughts of people having pain symptoms [15]. The self-reporting-based scale is a Likert-type scale. The scale has three subdimensions: rumination, magnification, and helplessness. The study on the Turkish scale's validity and reliability was conducted by Ugurlu et al. (2017) [16], who have reported reliability between 0.73 and 0.93, Cronbach's alpha of 0.95, and internal consistency coefficient of 0.83.

Barratt Impulsiveness Scale Short Form (BIS-11-SF); The scale developed to measure individuals' level of impulsivity was revised by Patton et al. (1995) [17]. The Likert-type scale is based on self-reporting and has three subdimensions: non-planning impulsiveness, motor impulsiveness, and attention impulsivity. The study on the validity and reliability of the Turkish version of the scale was conducted by Tamam et al.

(2013) [18], who have reported that the Cronbach's alpha value was between 0.64 and 0.82, and the internal consistency coefficient was high, although it varied in the subdimensions.

**Statistical Analyses**

The obtained data were analyzed using the Statistical Package for Social Sciences version 25.0 (IBM Corp., Armonk, NY, USA). The results are presented in number, percentage, and average. Regression analysis was performed to examine the relationships between variables and whether PC, impulsivity, and temperament variables differ in patient groups, and hierarchical regression analysis was performed on independent groups using a t-test to determine the predictive effects of temperament characteristics and impulsivity on PC.

**Results**

The study was conducted on 258 patients diagnosed with PD who met the inclusion criteria. In all patients, the primary complaint was pain. According to the Andersch and Milsom Scale, 42 of the women were grade 0, 79 were grade 1, 21 were grade 2, and 116 were grade 3. Furthermore, 137 patients (53.1%) whose functionality was significantly affected by pain were included in Group 1 (grade 2 + grade 3); 121 patients (46.9%) whose functionality was rarely affected by pain or unaffected were included in Group 2 (grade 0 + grade 1). In this way, the variables were examined to differentiate the pain perception in people who have received the same diagnosis. Demographic variables were similar in both groups. The demographic characteristics of all groups are shown in Table 1. According to the study results, total and subscale PCS score averages in Group 1 were significantly higher than those in Group 2. When both groups were examined according to their temperament characteristics, depressive, cyclothymic, irritable, and anxious temperament scores in Group 1 were significantly higher. The total BIS-11-SF scores, motor impulsiveness and attentional impulsiveness subscale scores in Group 1 were significantly higher than those in Group 2. The subscale scores and results of the t-test are shown in Table 2.

Significant results were obtained in the correlation analysis between PC levels, temperament characteristics, and impulsivity of patients in Group 1. In addition, significant positive correlations were observed between cyclothymic temperament ( $r = 0.244$ ) and the total PCS score, and between irritable temperament ( $r = 0.269$ ) and the total PCS score. A significant positive correlation was found between cyclothymic temperament ( $r = 0.210$ ) and the helplessness subscale of PCS and between irritable temperament ( $r = 0.220$ ) and the helplessness subscale of PCS. Moreover, a significant positive correlation was perceived between magnification and irritable temperament ( $r = 0.251$ ), magnification and anxious temperament ( $r = 0.181$ ), rumination and cyclothymic temperament ( $r = 0.280$ ), and irritable temperament ( $r = 0.272$ ) and anxious temperament ( $r = 0.194$ ). A weak positive correlation was determined between PCS and impulsivity in the rumination and attentional impulsiveness subscales ( $r = 0.173$ ). A hierarchical regression analysis was performed to examine the predictive effects of personality traits and impulsivity on PC in patients with PD. Within this context, analyses on multiple correlation problems were conducted, and the Durbin-Watson

**Table 1.** Sociodemographic characteristics

	Group 1 (n=137)	Group 2 (n=121)
Age, years (mean±SD)	25.30±7.67	26.96±9.35
	<b>n (%)</b>	<b>n (%)</b>
<b>Marital Status</b>		
Single	65 (47.45)	56 (46.28)
Married	70 (51.1)	65 (53.72)
Another	2 (1.45)	0 (0)
<b>Education</b>		
Elementary school	22 (16.1)	18 (14.9)
High school	39 (28.5)	40 (33.1)
University	75 (54.7)	63 (52.1)
Another	1 (0.7)	0 (0)
<b>Job</b>		
Student	53 (38.7)	56 (46.3)
Housewife	42 (30.7)	32 (26.4)
Worker	18 (13.1)	10 (8.3)
Official	24 (17.5)	23 (19.0)

**Table 2.** PCS, TEMPS-A and BIS-11-SF scores

	Group 1 (n=137)	Group 2 (n=121)	p	F	t
PCS Total	20.78±12.26	7.52±9.05	0.000*	34.131	9.77
Rumination	7.55±4.51	2.21±2.97	0.000*	49.822	11.07
Magnification	4.19±3.02	2.00±2.16	0.000*	35.090	6.62
Helplessness	9.06±6.03	3.07±3.49	0.000*	48.135	9.60
<b>TEMPS-A</b>					
Depressive temp.	5.64±3.40	4.54±3.21	0.008*	1.161	2.67
Siclotimic temp.	9.70±4.50	7.36±3.63	0.000*	7.620	4.56
Hypertimic temp.	10.10±4.16	10.44±6.58	0.621	47.440	-.50
Irritable temp.	4.65±3.81	2.78±3.79	0.000*	0.004	3.95
Anxious temp.	8.93±5.30	3.95±5.63	0.000*	0.093	7.31
BIS-11-SF Total	58.92±9.58	51.59±12.12	0.000*	8.211	5.42
Motor imp.	19.53±9.71	15.77±3.81	0.000*	2.338	4.00
Attentional imp.	15.59±3.62	13.19±3.30	0.000*	0.528	5.54
Nonplanning imp.	24.55±5.00	23.05±7.42	0.055	30.716	1.93

\*p<.05; PCS: Pain Catastrophizing Scale, TEMPS-A: Temperament Evaluation of Memphis, Pisa, Paris and San Diego – Autoquestionnaire, temp: temperament, BIS-11-SF: Short form of Barratt Impulsiveness Scale, imp: impulsiveness

**Table 3.** Hierarchical Regression: The effect of temperament traits and impulsivity on pain catastrophic in PD patients.

	Model 1			Model 2		
	B	S.E.	β	B	S.E.	β
Depressive temp.	-.097	.321	-.026	.075	.318	.020
Siclotimic temp.	.971	.286	.326**	.707	.289	.237**
Hypertimic temp.	.054	.138	.023	.051	.135	.022
Irritable temp.	.146	.291	.045	.140	.288	.043
Anxious temp.	.235	.203	.111	.187	.199	.088
Attentional imp.				.846	.223	.244**
Motor imp.				-.089	.104	-.054
Nonplanning imp.				.018	.120	.009
R		.425			.477	
R <sup>2</sup>		.18			.22	
Adj.R <sup>2</sup>		.16			.20	
R <sup>2</sup> change		.18			.4	

\*p<.05, \*\*p<.01 PD: Primary dysmenorrhea; SE: Standard error; temp: temperament; imp: impulsiveness; Adj.R<sup>2</sup>: Adjusted R<sup>2</sup>

value was determined to be 1.64. In the study of Model 1 in Table 3, temperament characteristics in patients with PD have a positive and significant predictive effect on PC ( $F = 11.13$ ;  $p < 0.05$ ). The adjusted  $R^2$  value is 0.16. This result shows that temperament characteristics explain 16% of the variance on PC. In the second model, the addition of impulsivity variables explained the variance of 4%, and this change in  $R^2$  was significant ( $F = 9.15$ ;  $p < 0.05$ ). Considering the values in Model 1, only cyclothymic temperament has a significant predictive effect on PC. A 1-point change in cyclothymic temperament causes a 0.32-point change in PC. In Model 2, attentional impulsiveness had an additional significant contribution in the model ( $p < 0.05$ ). All independent variables appear to explain the 20% variance in PC.

## Discussion

This study found that the functionality of patients with PD was significantly impaired by 53.1%, and the main symptom determining functionality was pain. PC levels of the patients with impaired functionality are significantly higher, and PC cognition is affected by the temperament characteristics and impulsivity levels.

Pain is a chronic and life-threatening symptom that patients with PD experience at an early age [19]. Pain beginning in adolescence, when brain development continues, negatively affects the cognitive development of patients with PD, predisposing them to depression [20] and other mental disorders [21]. Depression and anxiety increase pain sensitivity and sensitivity to a more negative perception of somatic complaints [22]. The mental health of patients with dysmenorrhea affects their perception of pain and ability to find rational solutions for pain. In the study by Cosic et al. (2013) involving 149 participants, PC was significantly higher in women with dysmenorrhea, and these patients used more analgesic drugs [23]. McPeak et al. (2018) have reported that PC was more common in women with secondary dysmenorrhea due to endometriosis, which significantly impaired these patients' quality of life [4]. PC is a cognitive error in which a person describes the pain they are experiencing in a more catastrophized way and unbearable than it is. In this study, unlike publications in the literature, only patients with PD were evaluated. It was concluded that PC scores were significantly higher in the group with more impaired functionality than those diagnosed with the same disease. From this viewpoint, the results of the research were evaluated in line with the literature.

Personality is the sum of all traits an individual has genetically and those subsequently acquired that differentiate them from others. Although temperament and personality are concepts used interchangeably, temperament more often represents the genetic dimension of personality [14]. In the literature, no studies have examined the temperament characteristics of patients with dysmenorrhea, and different results were reported in studies investigating personality characteristics. In the study by Khalajinia et al. (2008), introverted, neurotic, and insecure personality traits were more pronounced in patients with dysmenorrhea [7]. Among studies involving patients with PD only, some have suggested that neurotic, anxious, and extroverted personality traits [8] are observed more in these

patients, where others have suggested that the personality traits of these patients do not differ [24]. In this study, patients with PD had higher scores in depressive, cyclothymic, irritable, and anxious temperament characteristics. These temperament scores were significantly higher in patients with impaired functionality. Depressive, cyclothymic, irritable, and anxious temperament traits are associated with neurotic personality traits. The results of this study were evaluated based on these comments and in compliance with the literature.

Impulsivity, which is considered a personality trait, is characterized by problems including impatience, intolerance, and lack of attention [17]. In the literature, few studies have examined the level of impulsivity in patients with dysmenorrhea. In these studies, impulsive traits may be observed in patients with dysmenorrhea whose quality of life is impaired, and self-mutilating behaviors are more common in these patients [25]. This study found that impulsivity and its subscales, motor and attentional impulsiveness, were significantly increased in patients with PD with intense, excessive pain. PD, in which pain is a cyclical and severe symptom, is difficult to tolerate for an individual with impulsive characteristics. It is also difficult to expect that these individuals will develop a rational assessment of pain and be able to produce a healthy solution. When evaluated from this viewpoint, our findings are compliant with the literature.

Pain perception is a cognitive function affected by many variables, such as individual personality and temperament characteristics, mental status, and environmental factors. In the literature, studies have focused on the relationship between pain perception in chronic painful diseases and personality traits. According to Muris et al. (2008), neurotic personality traits reduce a person's tolerance to pain, as a result of which pain is experienced in a catastrophized way, making the pain severe [9]. According to Nitch et al. (2004), difficulty in managing pain and emotional difficulties in chronic painful diseases lead to exacerbation of neurotic personality traits [10]. In the literature, no studies have investigated the relationship of pain perception with personality or temperament characteristics in patients with dysmenorrhea. According to the hierarchical regression model in this study, which we think will contribute to the literature in this sense, cyclothymic temperament explains 16% of PC. This finding has been interpreted as an individual with a cyclothymic temperament, where emotional lability and intolerance are evident, can cause PC by negating PD pain to a greater extent than it actually is. When we added the impulsivity component to the established model, we found that only attention deficit was 4%. There are no studies in the literature examining the relationship between PC and impulsivity. The effects of attention deficit on PC are not high; however, it has been thought that it can disrupt the rational assessment of pain by difficulty in focusing on what is being experienced in the process of pain and cause failure of pain management.

In conclusion, an important symptom determining functionality in PD is pain. In patients with severe pain, pain perception is impaired, and the pain is catastrophized. PC differs according to the individual's temperament characteristics and the level of impulsivity. In addition to the gynecological treatment of patients with PD with poor symptom management, conducting

a psychiatric evaluation and implementing the necessary interventions are important. Multidisciplinary evaluation will increase individuals' quality of life and make a positive contribution to their functionality.

#### Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

#### Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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#### Conflict of interest

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