

# Effects of Type D Personality on SARS-CoV-2-Related Fears, Anxiety, and Depression in Patients with Chronic Pain

## Kronik Ağrı Hastalarında Tip D Kişilik Özelliklerinin SARS-CoV-2 İlişkili Korkular, Anksiyete ve Depresyon Üzerindeki Etkisi

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### Abstract

**Objective:** Individuals experiencing chronic pain have an elevated risk of psychological distress during a pandemic. This study aimed to examine the correlation between type D personality traits, apprehension regarding diseases and viruses, and anxiety and depression in patients with chronic pain throughout the pandemic period.

**Method:** The study included 115 patients with chronic pain who presented to the physical therapy outpatient clinic of our hospital. Data were collected from the patients using five instruments: Socio-demographic data form, visual analog scale, type D personality scale, fear of illness and virus evaluation scale (FIVE), Beck depression inventory, and Beck anxiety inventory. Participants were divided into two groups based on their type D personality, and data from the two scales were compared.

**Results:** Type D personality traits were identified in 36 patients with chronic pain included in the study. Although demographic characteristics showed no disparities between groups, individuals exhibiting type D personality traits displayed elevated scores in FIVE total, illness, and contamination fear, as well as anxiety and depression, compared with those without type D personality ( $p=0.013$ ,  $p=0.027$ ,  $p=0.032$ ,  $p=0.009$ , and  $p=0.032$ , respectively).

**Conclusion:** In patients with chronic pain, type D personality traits are associated with increased anxiety and depression along with fear of Coronavirus disease-2019-related illness and virus.

**Keywords:** Anxiety, chronic pain, COVID-19, depression, fear of illness and virus evaluation scale, SARS-CoV-2, type D personality

### Öz

**Amaç:** Kronik ağrı yaşayan bireyler, bir pandemi sürecinde psikolojik sıkıntıya daha fazla maruz kalabilirler. Bu çalışma, pandemi döneminde kronik ağrı hastalarında tip D kişilik özellikleri, hastalık ve virüs korkusu ile anksiyete ve depresyon arasındaki ilişkiyi incelemeyi amaçlamaktadır.

**Yöntem:** Çalışmaya hastanemizin fizik tedavi polikliniğine başvuran 115 kronik ağrılı hasta dahil edildi. Veriler, hastalardan beş enstrüman kullanılarak toplandı: Sosyo-demografik veri formu, görsel analog skala, tip D kişilik ölçeği, hastalık ve virüs değerlendirme ölçeği (FIVE), Beck depresyon envanteri ve Beck anksiyete envanteri. Katılımcılar, tip D kişiliklerine göre iki gruba ayrıldı ve ölçeklerden elde edilen veriler karşılaştırıldı.

**Bulgular:** Çalışmaya dahil edilen kronik ağrılı hastaların 36'sında tip D kişilik özellikleri tespit edildi. Demografik özellikler açısından gruplar arasında farklılık gözlenmezken, tip D kişilik özelliklerine sahip olanlarda, tip D kişilik özellikleri olmayanlara göre daha yüksek FIVE toplam skorları, hastalık ve kontaminasyon korku skorları ile anksiyete ve depresyon skorları saptandı (sırasıyla  $p=0,013$ ,  $p=0,027$ ,  $p=0,032$ ,  $p=0,009$  ve  $p=0,032$ ).

**Sonuç:** Kronik ağrılı hastalarda, tip D kişilik özellikleri Koronavirüs hastalığı-2019 ile ilişkili hastalık ve virüs korkusu ile birlikte artmış anksiyete ve depresyon ile ilişkilidir.

**Anahtar kelimeler:** Anksiyete, COVID-19, depresyon, hastalık ve virüs değerlendirme ölçeği, kronik ağrı, SARS-CoV-2, tip D kişilik

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## Introduction

The initial recognition of severe acute respiratory syndrome-coronavirus-2 was the identification of a novel viral respiratory condition in Wuhan, China, in December 2019, and spread rapidly through the respiratory tract, affecting the entire world (1). On March 11, 2020, the World Health Organization officially classified the illness as a worldwide pandemic, marking a critical juncture in the global health landscape (2).

Because the exact course of this first-ever pneumonia was unknown, uncertainty and panic arose around the world. A global quarantine was imposed with significant restrictions on education, social life, and work. The goal was to slow the spread of the virus. Socio-economic problems, social isolation, and feelings of loneliness elevate psychosomatic symptoms such as depression and anxiety, particularly acute stress, in society, besides the fear of illness, death, and loss of loved ones (3). There has also been a significant increase in the diagnosis of sleep disorders and post-traumatic stress disorder (3).

Chronic pain is characterized by the International Association for the Study of Pain (IASP) as enduring or repetitive pain that persists beyond a 3-month duration or persists after the usual tissue recovery period (4). It affects approximately 20% of the general population (5). Chronic pain causes disability, emotional instability, and social isolation, all of which significantly reduce quality of life (5). Pain management is a fundamental human right. However, the Coronavirus disease-2019 (COVID-19) pandemic has forced healthcare systems worldwide to devote resources to intensive care units and other COVID-19-specific facilities. Elective health services, including those for chronic pain, were suspended during this period. This leads to major disruptions in the management of patients with chronic pain (5). In addition, the fear of death from the disease, uncertainty, anxiety about the future, and the sense of being alone due to the inability to access health services have placed patients with chronic pain among the groups at higher risk of psychological distress compared to the broader community (5).

Type D personality may increase susceptibility to psychological distress during the COVID-19 pandemic. It is defined as a chronically stressed personality characterized by negative affect and social inhibition (6). Negative affect is described as an inclination toward adverse emotions such as melancholy, unease, despondency, and restlessness, while social inhibition

is defined as an incapacity to convey emotions in social settings due to the apprehension of rebuff (6,7). People with type D personality disorder are more likely to experience psychological distress, anxiety, depression, and physical and mental illness than those who do not have this personality (8,9).

We postulated that individuals exhibiting type D personality traits would demonstrate a correlation with heightened levels of anxiety, depression, and apprehension regarding COVID-related contamination and illness within the cohort of patients with chronic pain in our investigation. Individuals with type D personality traits are at increased risk of psychological distress during the pandemic among chronic pain patients. This study aimed to evaluate the impact of COVID-19 on the psychological aspects of individuals with chronic pain and investigate the influence of type D personality characteristics on these psychological symptoms. Consequently, an early identification of high-risk cohorts becomes feasible, thereby enabling timely referral for psychiatric interventions among susceptible individuals.

## Materials and Methods

### Sample

Participants included 115 patients who presented to our hospital's physical therapy outpatient clinic during the COVID-19 pandemic, were diagnosed with chronic pain according to the IASP's 2020 chronic pain diagnostic criteria, and were scheduled to receive electrotherapy treatment in our hospital's physical therapy department (4). None of our patients were carrying COVID-19.

### Inclusion and Exclusion Criteria

Inclusion criteria for the study; being between the ages of 18-65, having chronic regional pain lasting longer than 3 months, exclusion criteria; no known psychiatric or neurological disease. All participants consented to participate in the study.

### Ethical Considerations

The study adhered to the ethical principles stated in the Declaration of Helsinki. This study was approved by the Ethics Committee for Clinical Research at the Medipol University Faculty of Medicine (10840098-772.02-1217). The study was explained to the participants, and written informed consent was obtained.

## Evaluation

Several instruments were used to collect data. All participants completed the socio-demographic data form, visual analog scale (VAS), type D personality scale, Beck anxiety inventory, Beck depression inventory, and fear of illness and virus scale (FIVE).

**Socio-demographic data form:** This form assesses participants' age, gender, education, occupation, marital status, smoking and alcohol use, history of chronic illness, drug use, psychiatric illness, and psychiatric drug use.

**VAS:** The VAS is evaluated on a scale of 10 points. 0 indicates no pain and 10 points indicates unbearable pain. 1-3 indicates mild, 4-7 moderate, 8-10 severe pain (10).

**Type D personality scale (DS-14):** The DS-14 assesses distressed personality. It contains 14 items characterized by two subscales: Negative affect and social inhibition. Each item has a score ranging from 0 to 4 (11). Individuals who scored 10 or higher on both subscales are classified as having a type D personality.

**Beck anxiety inventory:** The Beck anxiety scale was used to measure anxiety levels. The test comprises 21 questions with scores ranging from 0 to 3. The scale yields a total score ranging from 0 to 63, with high scores indicating high levels of anxiety (12).

**Beck depression inventory:** The Beck Depression Inventory consists of 21 questions, each with a score ranging from 0 to 3. The total score ranged from 0 to 63, with higher scores indicating severer depression (13).

**FIVE scale:** This scale was developed by Professor Jill Ehrenreich-May from the University of Miami. There are three versions of FIVE (adult, child and parent). The adult version consists of a total of 35 items and four subscales (1: Fears about contamination and illness, 2: Fears about social distancing, 3: Behaviors related to illness and virus fears, and 4: Impact of illness and virus fears). This is a 4-point Likert-type scale consisting of 35 questions, with scores ranging from 1 to 4 (14). The scale generates a total score ranging from 0 to 140. Total and percentile scores can be calculated for each subscale. The subscale totals are as follows: 36 for the fears of contamination and illness subscale, 40 for fears about social distancing, 56 for behaviors related to illness and virus fears, and 8 for the impact of illness and virus fears. Higher scores on the behaviors related to illness and virus fears subscale indicate that fear-related behaviors were more frequent. Higher scores on the impact of illness and virus fears subscale reflects a higher level of potential

deterioration. Permission was obtained for the original and translated forms.

## Statistical Analysis

The normality of distribution of continuous variables was tested using the Shaphiro-Wilk test. The Mann-Whitney U test was used to compare non-normal data, and the Kruskal-Wallis and Dunn multiple comparison tests were used to compare non-normal data among the three groups. The chi-square and Bonferroni tests were used to examine relationships between categorical variable pairs. Spearman's correlation test was used for the correlation analysis. Statistical analysis was performed using SPSS for Windows version 24.0. Correlations were evaluated using Spearman's rank correlation coefficient.  $P < 0.05$  was considered statistically significant.

## Results

This study included 115 patients with chronic pain (53 with low back pain, 32 with neck pain, 17 with knee pain, and 13 with shoulder pain) scheduled to receive electrotherapy in the hospital. The mean duration of pain was  $9 \pm 3.4$  months. The average age of the subjects was  $44.5 \pm 14.1$  years. The participants were 65.2% ( $n=75$ ) female and 34.8% ( $n=40$ ) male. They were 77.4% ( $n=89$ ) married and 22.6% ( $n=26$ ) single. History of concomitant chronic diseases (diabetes, hypertension, hypothyroidism, and asthma) was present in 39.1% ( $n=45$ ) of the participants. Among the participants, 23.5% were smokers; none had a history of alcohol consumption. The mean VAS score of the patients was  $6.4 \pm 1.4$ . The mean total FIVE score in patients with chronic pain was  $64.5 \pm 19.0$  (Table 1). The FIVE total score had a

**Table 1. Average clinical parameter values for chronic patients**

	Mean $\pm$ SD
Age	$44.5 \pm 14.1$
VAS	$6.4 \pm 1.4$
Negative affect	$10.9 \pm 7.3$
Social inhibition	$9.3 \pm 5.2$
Anxiety	$10.0 \pm 9.4$
Depression	$10.0 \pm 7.6$
FIVE total	$64.5 \pm 19.0$
Fear of contamination and illness	$16.9 \pm 6.9$
Behaviors related to illness and virus fear	$25.5 \pm 8.7$
Impact of illness and virus fears	$2.8 \pm 1.3$
Fears of social distancing	$18.9 \pm 7.4$

VAS: Visual analog scale, FIVE: Fear of illness and virus evaluation, SD: Standard deviation

weak positive correlation with negative affect and social inhibition ( $p=0,012$  and  $p=0.007$  correspondingly).

The prevalence of type D personality disorder among individuals with chronic pain was 31.3% ( $n=36$ ). No disparities in socio-demographic characteristics were observed between patients with chronic pain and those with type D personality (Table 2). Patients exhibiting type D personality in the chronic pain group displayed markedly elevated scores for anxiety and depression compared with those without ( $p=0.009$  and  $p=0.032$ , correspondingly). In patients with chronic pain and type D personality, the mean FIVE total score was  $70.0\pm17.9$ . The FIVE total score and the FIVE fear of contamination and illness subscale score were significantly higher in chronic patients with type D personalities than in chronic patients without type D personalities ( $p=0.013$  and  $p=0.027$ , correspondingly) (Table 3). When the patients with chronic pain were evaluated according to sex, there were more female patients, with a rate of 65.2% ( $n=75$ ). Depression, anxiety, effect of concerns about illness and viruses, and negative affect were found to exhibit a notable increase in female individuals suffering from chronic pain compared with

male patients ( $p=0.002$  and  $p=0.001$ , correspondingly) (Table 4). Nevertheless, gender-based demographic data did not reveal any noteworthy distinctions.

Correlational analysis indicated that negative affect, a component of type D personality, exhibited a mild positive correlation with anxiety, the total FIVE score, and the impact of illness and virus fears and moderate positive correlation with depression among patients with chronic pain. The social inhibition subscale of type D personality demonstrated a weak positive correlation with depression, total FIVE score, fear of contamination and illness, and concerns about social distancing (Table 5).

## Discussion

Being the first study to examine illness and infection-related anxiety and psychological status in patients with chronic pain during the COVID-19 pandemic, our findings revealed that depression and anxiety levels, the impact of illness and virus fears, and negative affectivity were significantly higher in female patients than in male patients. When the effect of type D personality on patients with chronic pain

**Table 2. Comparison of the socio-demographic characteristics of the groups**

Type D		No	Yes	p
Gender	Female	49 (62.0%)	26 (72.2%)	0.393
	Male	30 (38.0%)	10 (27.8%)	
Marital status	Married	60 (75.9%)	29 (80.6%)	0.759
	Single	19 (24.1%)	7 (19.4%)	
Smoking	Yes	17 (21.5%)	10 (27.8%)	0.619
	No	62 (78.5%)	26 (72.2%)	
Comorbid disease	No	52 (65.8%)	18 (50.0%)	0.16
	Yes	27 (34.2%)	18 (50.0%)	

**Table 3. Comparison of clinical parameters between patients with chronic pain with and without type D personality**

Type D	No (79)	Yes (36)	p-value
Age	43.6 $\pm$ 14.3	46.3 $\pm$ 13.8	0.372
VAS	6.1 $\pm$ 0.3	6.5 $\pm$ 1.7	0.926
Negative affect	7.6 $\pm$ 5.4	18.61 $\pm$ 5.14	<0.001
Social inhibition	6.8 $\pm$ 3.5	15.06 $\pm$ 4.1	<0.001
BAI	8.5 $\pm$ 9.0	13.39 $\pm$ 9.6	0.009
BDI	7.8 $\pm$ 5.3	15.34 $\pm$ 9.5	<0.001
FIVE total	62.0 $\pm$ 19.1	70.0 $\pm$ 17.9	0.013
Fear of contamination and illness	15.9 $\pm$ 6.3	19.4 $\pm$ 7.7	0.027
Behaviors related to illness and virus fear	24.8 $\pm$ 8.18	27.0 $\pm$ 9.7	0.351
Impact of illness and virus fears	2.8 $\pm$ 1.4	2.9 $\pm$ 1.2	0.387
Fears of social distancing	18.3 $\pm$ 7.6	20.1 $\pm$ 7.0	0.177

VAS: Visual analog scale, BAI: Beck anxiety inventory, BDI: Beck depression inventory, FIVE: Fear of illness and virus evaluation

was evaluated, anxiety and depression scores, FIVE total score, and behaviors associated with illness and virus fears were notably higher in those exhibiting type D personality than in those without. Our study also found that illness and virus fears were associated with negative affect, anxiety, depression, and the FIVE total score, indicating the negative psychological impact of the pandemic on patients with chronic pain. These results support our hypothesis that type D personality is associated with depression, anxiety, and illness-virus fear in individuals with chronic pain. As far as we know, our study is the first to explore the connection between type D personality and fear of viruses in patients with chronic pain.

Earlier studies have associated possessing a type D personality, also referred to as a “stressed personality” or “distressed personality”, with heightened levels of anxiety, depression, diminished quality of life, and an unfavorable self-assessment of health conditions (15). Individuals with type D personalities tend to experience increased worry,

heightened nervousness, and self-blame. They maintain a pessimistic outlook on life and possess low self-confidence and life satisfaction (8,9). Furthermore, individuals with type D personalities harbor negative perceptions of social relationships, experience reduced social support, and exhibit weak connections with others (16). Considering these factors, the presence of a type D personality in individuals with chronic pain who are already vulnerable to psychological impacts due to the heightened stress and anxiety associated with the pandemic exacerbates their situation.

Research has examined that examine individuals characterized by type D personality in terms of how this personality affected them during the COVID-19 epidemic. Gębska et al. (17) identified that stomatognathic system disorders were most frequently associated with symptoms such as headaches, pain in the neck and shoulder girdle, and teeth clenching among physiotherapy students with type D personality, surpassing those without type

**Table 4. Evaluation of clinical parameters according to sex**

Gender	Female (75)	Male (40)	p-value
Age	45.5±11.1	48.1±18.1	0.592
VAS	6.5±1.1	6.3±2.1	0.38
BAI	12.1±10.0	5.9±6.4	<b>0.001</b>
BDI	11.3±7.3	7.3±7.7	<b>0.002</b>
Negative affect	12.0±7.3	8.6±6.9	<b>0.017</b>
Social inhibition	9.4±4.9	9.1±5.9	0.594
FIVE total	62.7±19.2	67.5±18.1	0.093
Fear of contamination and illness	17.0±6.7	16.9±7.2	0.841
Behaviors related to illness and virus fear	24.1±7.7	28.0±9.7	<b>0.033</b>
Impact of illness and virus fears	2.8±1.3	2.8±1.5	0.381
Fears of social distancing	18.5±7.5	19.5±7.4	0.37

VAS: Visual analog scale, BAI: Beck anxiety inventory, BDI: Beck depression inventory, FIVE: Fear of illness and virus evaluation

**Table 5. Correlation analysis**

Parameter	Negative affect		Social inhibition	
	r	p	r	p
BAI	0.38	<b>&lt;0.001</b>	0.119	0.225
BDI	0.618	<b>&lt;0.001</b>	0.296	<b>0.002</b>
VAS	0.013	0.931	0.034	0.822
FIVE total	0.244	<b>0.012</b>	0.263	<b>0.007</b>
Fear of contamination and illness	0.187	0.054	0.305	<b>0.001</b>
Behaviors related to illness and virus fear	0.15	0.126	0.087	0.376
Impact of illness and virus fears	0.202	<b>0.039</b>	0.114	0.247
Fears of social distancing	0.145	0.138	0.21	<b>0.031</b>

Note: Spearman's Correlation test

VAS: Visual analog scale, BAI: Beck anxiety inventory, BDI: Beck depression inventory, FIVE: Fear of illness and virus evaluation  
Negative emotional social inhibition is a component of type D personality



D personality in their study exploring the correlation of SSD with type D personality during the pandemic. In a separate investigation conducted by Gębska et al. (18), individuals with symptoms of type D personality were significantly more prone to temporomandibular joint issues. Moreover, the incidence of depression was notably higher among students who exhibited type D personality traits. Tuman (19) identified a correlation between type D personality and heightened levels of anxiety, depression, and fear of illness and virus among healthcare workers during the pandemic. Condén et al. (20) found that psychosomatic symptoms were strongly associated with type D personality and musculoskeletal pain. We observed that individuals with chronic pain exhibiting type D personality traits demonstrated elevated levels of anxiety, depression, and apprehension regarding illness and viruses compared with those without type D personality traits.

Depression and chronic pain are two conditions that affect each other. Studies have shown that both are related to brain regions and the nervous system, and that depression can worsen pain perception (21-23). There is also evidence that chronic pain can lead to depression (22). In patients with chronic pain and depression, higher levels of pain intensity and functional limitations are observed. Pain management is also more difficult in patients with depression (22). The relationship between pain and depression can be better explained by neurobiological factors. The same neurotransmitters are known to affect both pain and mood (23). Individuals with type D personality traits are more susceptible to depression (15). This is even more significant in patients with chronic pain and type D personality. In infectious disease outbreaks, anxiety, depression, and general fear increase (24). Studies on SARS survivors have shown that the most common long-term psychiatric problems are post-traumatic stress disorder and depression (24). Similarly, increases in post-traumatic stress disorder, depression, panic disorder, and obsessive-compulsive disorder have been observed in patients with COVID-19 (25,26). The coexistence of chronic pain and type D personality disorder can negatively impact mental well-being and reduce quality of life. Therefore, an early diagnosis of type D personality disorder and effective pain management are important.

In our study, 31.3% of patients with chronic pain had a type D personality. This personality type is associated with various diseases, particularly cardiovascular conditions (27). Evidence suggests that type D personality traits

increase the risk of heart attack and are more common in individuals with heart disease, establishing a link between these personality traits and cardiovascular conditions (27). Several studies have found the prevalence of type D personality to be 31.9% in patients with myofascial pain syndrome, 33% in those with fibromyalgia syndrome, 38.7% in those with psoriasis, and 44.5% in those with multiple sclerosis patients (15,28-30). Our study's findings are similar to other research on the prevalence of type D personality. However, it is important to note that the prevalence of type D personality may vary across countries due to genetic and cultural factors (31). Our study also found that female patients with chronic pain had higher levels of depression, anxiety, illness, virus fear impact, and negative affect than male patients. This may be due to women's increased susceptibility to psychological stress, different stress-coping behaviors between genders, and the female gender being a risk factor for various psychiatric disorders (32). Additionally, the prevalence of chronic pain is higher in women than in men (33). Similarly, our study found that 65.2% of patients experienced chronic pain.

This study used the newly developed FIVE scale to assess illness and virus fear in patients with chronic pain following the COVID-19 pandemic. In a larger study involving 560 individuals, including healthcare workers, primary immunodeficiency patients, and those with severe asthma and additional comorbidities (cancer, cardiovascular disease, hypertension, and diabetes), healthcare workers' scores were significantly higher than those of other risk groups. Notably, hypertensive patients had the lowest scores on all scales. In our study of 115 patients with chronic pain, the FIVE total score was found to be  $64.5 \pm 19.0$ . In the Çölkesen et al. (34) study, FIVE total scores showed a positive correlation with depression and anxiety scores. Although our study did not show a correlation between FIVE total scores and anxiety or depression, a positive correlation was found between negative affectivity and social inhibition scores.

Intervening type D personality traits can provide numerous benefits, both individually and socially. These interventions can help reduce the risk of chronic health conditions, enhance quality of life, diminish negative emotions such as anxiety and depression, improve social functioning, and lower healthcare costs. Investing in interventions to improve type D personality traits is a significant investment for both individuals and society.

## Study Limitations

There are certain limitations to our study: First, our study is a cross-sectional study. Second, patients were assessed using self-report scales without undergoing a psychiatric diagnostic interview. Third, given that the research was conducted on individuals with chronic pain scheduled for treatment in the physical therapy department of our hospital during the pandemic, it was not feasible to perform comparisons with a control group from the general population lacking comorbidities. In addition, type D personality is a relatively new concept that has not yet been fully accepted in the literature. Some researchers argue that there are not enough evidence to consider type D personality as a separate personality type and that its stigmatizing nature warrants ethical scrutiny. More research is needed in the future to better understand type D personality, including its causality, diagnostic criteria, and treatment.

## Conclusion

This study investigated the psychological impact of the COVID-19 pandemic on patients with chronic pain. To our knowledge, this study represents the first exploration of the connection between type D personality traits and fears of illness and viruses in patients with chronic pain during the pandemic. Anxiety, depression, and fears of illness and viruses were discerned to be more prevalent in patients with chronic pain exhibiting type D personality traits. In addition, female patients and those exhibiting type D personality traits experienced higher levels of depression, anxiety, illness and virus fear, and negative affect. These results highlight the vulnerability of patients with chronic pain during public health crises and underscore the importance of considering personality traits when evaluating psychological well-being. Our study also identified a positive correlation between illness and virus fears and negative affectivity, anxiety, and depression in patients with chronic pain. This suggests that the pandemic has exacerbated negative emotions and psychological distress in this population. Further research is needed to explore the long-term psychological effects of the pandemic on patients with chronic pain and to develop targeted interventions to improve their mental health and quality of life.

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## Ethics

**Ethics Committee Approval:** The study adhered to the ethical principles stated in the Declaration of Helsinki. This study was approved by the Ethics Committee for Clinical Research at the Medipol University Faculty of Medicine (10840098-772.02-1217).

**Informed Consent:** The study was explained to the participants, and written informed consent was obtained.

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