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A World Unplugged

Fractal fascism and the global psychopolitics of cruelty in late capitalism

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In 2023, the Lancet–World Psychiatric Association Commission warned of a silent yet escalating mental health crisis—depression rates had soared, not only due to biomedical causes, but as responses to chronic disempowerment, sociopolitical disintegration, and the breakdown of shared symbolic structures (1). Against this backdrop, the March 2025 issue of Lancet Psychiatry called on President Trump to reconsider the psychological consequences of his early executive actions in first 100 days—including the 80% defunding of the World Health Organization (WHO) and further liberalisation of arms control (2).

But cruelty is rarely abstract. While The Lancet Psychiatry reflected on the first 100 days of Trump's second presidency, The Lancet carried another story of 100 days—a letter from Nigeria, opening with a bleak yet powerful line: "Nigeria's premier teaching hospital—University College Hospital, Ibadan—has endured over 100 days without electricity…"(3) The crisis, we learn, was not due to war or natural disaster, but a debt of roughly $258,000 to the Ibadan Electricity Distribution Company (IBEDC)—an astonishingly low sum for a calamity so severe. This institutionalised cruelty is just one example of capital's indifference. But this blackout is more than local—it mirrors a global pattern of neglect. Imagine, if you will, a hospital plunged into darkness for over 100 days.

On its website, IBEDC presents itself as a customer-oriented, high-performance utility company that values "open communication" and "unity." Yet one must ask: how and among whom did this "open communication" function when a hospital remained in darkness for over three months? And when the company speaks of "unity," is it referring to solidarity among people—or the consolidation of capital?

The power outage in Ibadan is not just a local infrastructure failure—it is the material echo of global psychopolitics. During the COVID-19 pandemic, U.S. President Donald Trump accused the WHO of favouring China and undermining U.S. interests. Though Biden reversed Trump's initial attempt to withdraw, Trump's return to office in 2025 marked a renewed attack: one of his first acts was to slash U.S. funding to the WHO by 80%, a move which jeopardised support for programs including HIV, malaria, and childhood immunisation in Nigeria (4).

The decision to drastically reduce funding to the WHO, particularly following the organisation's favourable assessments of China's pandemic response and its criticisms of the U.S., invites psychological reflection as much as political analysis. From a psychoanalytic perspective, such actions evoke the contours of a narcissistic injury-where the leader's idealised image of national and personal grandiosity comes into conflict with an external narrative that fails to affirm it. In this context, the defunding move appears less a strategic adjustment than a psychic reaction, marked by primitive defences such as projection, withdrawal, and omnipotent reversal. What unfolds on the global stage, then, is not merely a geopolitical dispute, but a psychological case shaped by the unconscious need to defend against perceived humiliation and loss of control.

In our clinical practice, we recognise this process: the subject, unable to symbolise frustration, locates the persecutory object outside and attacks it. Here, the WHO became the scapegoat, and as a consequence, hospitals were left in darkness-both literally and structurally.

These authoritarian tendencies are no longer Agamben's 'state of exception'(5) but signal a broader transformation of political subjectivity. The reactivation of collective narcissism like before the World War II—defined by the idealisation of the ingroup and intense resentment toward outgroups-finds fertile ground in late capitalist disintegration (6). The symbolic ego-ideals that once mediated social cohesion collapse, and what arises instead are fantasies of restoration, purification,

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and grandeur. Drawing from Melanie Klein, we can say that persecutory anxieties and projective mechanisms dominate public discourse in times of uncertainty. Paranoid-schizoid defenses re-emerge, such as fragmentation, idealization of the self, devaluation of the other and retreat into authoritarian structures that promise control (7).

As Noëlle McAfee writes in Interpreting the Fractal Nature of Social Experience, social structures tend to reproduce themselves at every scale. The concept of 'fractal fascism', as theorised by her (8), describes how these authoritarian patterns replicate not only in state governance but in classrooms, family dinners, WhatsApp groups, and professional boards. Fractal fascism is the diffusion of authoritarian power into the intimate spaces of social life. It is ambient, distributed, and intimate.

The tragedy is not simply the rise of narcissistic leaders, but our increasing identification with them. As Freud noted in Group Psychology and the Analysis of the Ego (9), the crowd suspends its critical function by merging its ego-ideal with the leader. This libidinal economy makes cruelty banal, even celebrated—especially when directed toward the devalued other. And yet, as Hannah Arendt warned, the banality of evil lies precisely in this structural dissociation (10). In this late capitalist age, the Enlightenment ideals forged through centuries of human struggle -equality, freedom, fraternity, and, above all, justice no longer structure our symbolic order—they linger only as ghosts of a collective dream now disavowed. What is framed as administrative necessity-like cutting power to a hospital-masks the quiet devastation it brings: Human suffering and psychological trauma pushed beyond the reach of visibility or accountability. Such disavowal is central to neoliberal governance, which replaces ethical responsibility with metrics, contracts, and market logic.

Mental health professionals are now treating the psychic aftershocks of this collective pathology. Depression emerges not merely from internal conflict, but from a collapse in the capacity to symbolise hope for a meaningful life. Late capitalism exploits not only labour but also fantasy and attachment. it depletes hope (11).. Despair is not a side effect-it is a governing strategy.

The true horror of our time may not be spectacular violence, but its fractal repetition—structurally minor cruelties playing out in endless variation. Fractal fascism describes the diffusion of authoritarianism into the micro-relationships of everyday life. The task, then, is to track how these macro-level defences are internalised, how the subject comes to collude with power through misrecognition, and how the capacity to symbolise suffering might be restored. To resist it, we must begin by recognising it—first in states, institutions and all the societal structures then in ourselves. For clinicians, the call is clear: protect the values of care-justice, equality, transparency, and solidarity-everywhere they are under threat, including within us. Now is the time for mental health professionals to act-not only to treat suffering, but to oppose the structures that produce it. We must defend the ethics of care in all directions: from policy to practice, from system to soul!

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From likes to obsessions: The mediating role of obsessive compulsive symptoms in the relationship between social media addiction and orthorexia nervosa

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SUMMARY

Objective: The study aims to investigate how social media addiction affects orthorexia nervosa through obsessive compulsive symptoms. The mediator role of obsessive compulsive symptoms in the relationship between social media addiction and orthorexia nervosa was examined.

Method: Participants consisted of 268 female and 53 male undergraduate students, totaling 321. The age of participants ranged between 18 and 30, and the mean age was 21.78±2.29. Personal information form, social media addiction scale, Padua inventory, and Ortho-11 were administered to the participants. Descriptive statistics, reliability analysis, and correlation analysis were conducted in SPSS 24, and mediation analysis was performed by Process plugin with model 4.

Results: Results of the study revealed that there is a significant positive relationship between orthorexia nervosa tendency and obsessive-compulsive symptoms. Also, there is a positive correlation between social media addiction and obsessive-compulsive symptoms. The findings of mediation analysis showed that social media addiction increases an individual's orthorexia nervosa tendency through obsessive compulsive symptoms. The findings indicate that obsessive-compulsive symptoms significantly mediate the relationship between social media addiction and orthorexia nervosa.

Discussion: This study suggests that social media addiction indirectly influences orthorexia tendencies through the development of obsessive-compulsive symptoms, highlighting the importance of addressing both social media use and obsessive-compulsive symptoms in interventions.

Key Words: Eating disorders, orthorexia nervosa, social media, obsessive compulsive symptoms.

INTRODUCTION

Internet usage in Turkey has surged to 69 million users, reflecting an increase of 3 million over the past year. Similarly, the number of social media users has reached 57.1 million, marking an increase of 8.5 million within the same period (1). This rapid growth reflects the pervasive influence of digital platforms on contemporary lifestyles, where the internet and social media are not merely tools for communication but integral elements shaping daily routines, social interactions, and even personal health behaviors.

Recent studies highlight that excessive social media usage can exacerbate various psychological disorders, notably obsessive compulsive behaviors and eating disorders like orthorexia nervosa. Obsessive compulsive disorder is characterized by persistent, unwanted thoughts (obsessions) and repetitive behaviors (compulsions) that individuals feel compelled to perform. These behaviors are often aimed at reducing anxiety or preventing some dreaded event or situation but are not realistically connected to what they are designed to neutralize or prevent (2). The literature reveals those individuals with nonclinical obsessive–compulsive disorder symptoms tend to experience greater social media

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fatigue due to fear of missing out and compulsive social media use (3).

Online platforms have revolutionized the accessibility and dissemination of information, including that related to nutrition and health. As a result, information about unusual eating habits and unusual calorie values has become widely available, promoting a dichotomous view of food as either 'good' or 'bad.' This categorization is often driven by trends favoring healthy and organic foods while demonizing those perceived as unhealthy. Consequently, while some users benefit from increased awareness of healthy eating, others may develop disordered eating patterns, such as orthorexia nervosa, characterized by an unhealthy obsession with healthy food (4).

Orthorexia nervosa diverges significantly from general healthy eating. It involves an obsessive fixation on food quality and purity, leading to severe dietary restrictions and social isolation. Individuals with orthorexia nervosa experience a diminished accep-table food list over time, increasingly excluding foods perceived as impure. This behavior often results in a disrupted social life, as individuals avoid eating out and spend excessive time planning and preparing meals (5). Moreover, orthorexic individuals' extreme interest in food ingredients contrasts with conditions like anorexia nervosa and bulimia nervosa, where the focus is more on the quantity of food consumed (6). Although orthorexia is not officially recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), there is growing advocacy for its inclusion due to its distinct and significant clinical impact (7). A study found that orthorexia nervosa assessments created before the 2016 revised orthorexia nervosa diagnostic criteria do not fully capture obsessive-compulsive symptoms, while more recent assessments found consistently significant, larger relationships, highlighting a previously underrated obsessive compulsive component of orthorexia nervosa (8). Studies have demonstrated that social media addiction can lead to increased anxiety, perfectionism, and, ultimately, obsessive compulsive behavior (9,10). These behaviors often set the stage for the onset of orthorexia nervosa, as individuals become fixated on adhering to overly restrictive diets that they believe are promoted by social media influencers and communities (11). Orthorexia nervosa involves obsessive thoughts about healthy eating and distress related to this obsession, and it shares commonalities with obsessive-compulsive disorder (12). Individuals with orthorexia nervosa often exhibit high levels of obsessive-compulsive symptoms, mirroring the intrusive thoughts and ritualistic behaviors seen in obsessive-compulsive disorder (13).

The compulsive nature of social media platforms, which frequently promote idealized body images and lifestyles, can exacerbate existing mental health conditions and contribute to the development of new ones (14,15). Specifically, social media addiction has been linked to heightened obsessive-compulsive tendencies. Users are continually exposed to content that increases their anxiety and perfectionism, further fueling these behaviors (16). A study also found that the incidence of orthorexia nervosa was higher in obese individuals who scored higher on the social media addiction scale, suggesting a potential relationship between social media addiction and orthorexia nervosa (17). Another study indicated that longer time spent on social media is associated with a higher prevalence of orthorexia nervosa, highlighting a potential link between social media usage and orthorexia nervosa (18).

Orthorexia nervosa and obsessive compulsive disorder are conditions characterized by obsessive behaviors, but their relationship remains under investigation. A study involving college students found a high prevalence of both orthorexia nervosa (37%) and obsessive compulsive behaviors (38.5%), with a significant positive correlation between orthorexic and obsessive-compulsive behaviors (19). Another study demonstrated that individuals with obsessive-compulsive disorder had higher orthorexia tendencies, particularly among those with order-symmetry obsessions (20). Research indicates that orthorexia nervosa shares clinical characteristics with both eating disorders and obsessive-compulsive disorder, correlating more strongly with both eating disorders than obsessive-compulsive symptoms (21). Orthorexia nervosa might be a distinct behavioral pattern, overlapping with obsessive-compulsive disorder in certain psychopathological features but sharing sig-

nificant similarities with eating disorders (22). Orthorexia nervosa is characterized by symptoms such as intense avoidance of unhealthy foods and a pathological fixation on healthy eating, which overlap with obsessive-compulsive symptoms like obsession and ritualistic behavior (23). Orthorexia nervosa and obsessive-compulsive disorder are interrelated, with significant overlap in obsessive and compulsive behaviors.

This study aimed to investigate the role of obsessive compulsive behaviors as a mediating mechanism for the effect of social media addiction on orthorexia nervosa tendency. A previous study showed that greater Instagram usage is associated with heightened symptoms of orthorexia nervosa. Healthy eating communities on social networking sites are particularly influential in this context, as they encourage users to adopt healthy dieting habits, which may result in an obsession with healthy food (24). Also, another study found that Facebook use may increase OCD severity through obsessive-compulsive related beliefs (25). This result suggests that Facebook usage contributes to the severity of OCD by reinforcing stress-inducing beliefs (26), and using excessive social networking sites may predict the severity of OCD through obsessive beliefs similar to impulse (25). This mediation model will provide an answer to the question as to how social media addiction transmits its effect on orthorexia nervosa. Such insights are crucial for developing effective interventions that address the root causes of these disorders and promote healthier social media consumption and eating habits.

METHODS

Participants

An a priori power analysis was conducted to determine the minimum number of participants needed to test the hypothesis by using G*Power version 3.1. (27) for sample size estimation, based on data from a published study (28) (N = 242). The effect size in the published study's study was .21, considered to be small to medium using Cohen's (1988) criteria. With a significance criterion of $\alpha = .05$, the minimum sample size needed with this effect size is N = 77 for the linear multiple regression test. Thus, the obtained sample size of N = 321 is more than adequate to test the study hypothesis. The inclusion criterion was physically and mentally healthy individuals between the ages of 18 and 30. The exclusion criterion is a diagnosed psychiatric disorder.

Data were collected from 321 undergraduate students, 268 female (83.5%) and 53 male (16.5%). The age of participants ranged between 18 and 30, and the mean age was 21.78±2.29. Participants stated that they did not have a psychiatric diagnosis. 10 participants (3.1%) have a vegetarian or vegan diet type, and 311 participants (96.9%) are omnivores and do not have a vegetarian or vegan diet type. The mean body mass index of participants is 21.51±2.97. 289 (90%) participants had no plastic surgery experience, and 32 (10%) participants had plastic surgery experience. Considering the frequency of exercising, 113 participants (35.2%) reported no exercise, 112 participants (34.9%) two days a week or less, 53 participants (8.7%) do exercise two to four days a week, and 18 participants (4.7%) do exercise to 6 days a week and 15 participants do exercise every single day.

Procedure

Ethical eligibility of the research was approved by the Ethics Committee of Istanbul Ticaret University (E-65836846-044-201961, 04.02.2021) The data of the study were collected through an online platform. An informed consent form was presented to the participants, and each participant stated participation voluntarily to research. Also, the participants were informed that the research data would be used only for scientific purposes and anonymous. The duration to complete the survey is approximately 20 minutes. The data collection period was from 15.02.2022 until 27.03.2022, lasting six weeks.

Instruments

Personal Information Form: This form includes questions about the participants' sociodemographic information (gender, age, education level). Personal information such as eating habits, exercise frequency, plastic surgery experience, diet type, body weights, and heights (to calculate BMI) infor-

mation were asked. Also, questions related to the Internet and social media were administered to participants.

The Orto-11: The original scale was developed to measure the orthorexia symptomatology of individuals by (29). The scale consists of 15 items and three factors which are cognitive rational, clinical, and emotional domains. It presents a four-point Likert scale (1 = Always to 4 = Never). Lower scores on the scale indicate increased orthorexia tendency. Turkish adaptation study showed that four items that had a low level of factor loading (< .50) were excluded from the scale, 11 items version has more statistically significant psychometric properties (30). So, the name was revised to Ortho-11, in the Turkish version of the single factor structure. The internal consistency coefficients of the scale for adaptation and the current study, respectively are .62 and .74. The cutoff point was not determined in the Turkish adaptation study. So, in this study handled as a continuous variable, the likelihood of orthorexia nervosa symptoms was measured.

Social Media Addiction Scale - Adult Form: It was developed to measure individuals' problematic social media usage (31). It consists of 20 items and two factors, response is five-point (1 = Not at all suitable for me', 5 = Very suitable for me) Likert scale. The reliability coefficient internal consistency coefficient is .94 and the test-retest reliability coefficient is .93 for the total scale. A higher score means an individual's addiction to social media. The internal consistency coefficient for this study is .89.

Padua Inventory - Washington State University Revision: This scale measures obsessive compulsive symptomatology and consists of 5 sub-dimensions which are obsessional thoughts about harming oneself/others, obsessional urges to harm oneself/others, compulsions to control, contamination/contamination obsessions and cleaning compulsions, and self-care rituals (32). In this study, a total score was examined. Turkish adaptation study of scale showed that PE-WEUR has a satisfactory level of internal consistency (.93) and test-retest reliability is .86 (23). Also, the internal consistency coefficient for this study is .94.

Statistical Analysis

Descriptive statistics, reliability analysis, and correlation analysis were conducted in SPSS 24. Then, to test the hypothesis, model 4 simple mediation template was performed by Process plug-in SPSS (34). All indirect effects were analyzed with 5000 bootstrap resamples at a 95% confidence interval. In the study, the predictor variable is social media addiction, the predicted variable is orthorexia nervosa, and the mediating variable is obsessive compulsive symptoms. Skewness and kurtosis values ranged between -2 and +2, and data were normally distributed (35). And, then hypothesis, the mediator role of obsessive compulsive symptoms between organizational social media addiction and orthorexia nervosa was examined.

RESULTS

Descriptive Analyses

As shown in Table 1, almost half of the participants (50.2%) spent between 5 and 7 hours a day on the Internet. Most of the participants are members of a social media platform (96.6%), and they have had a social media account for at least 4 years. (85.3%). The purpose of using the internet from high to low, respectively, to communicate with someone, to be informed of something, social media, shopping, watch series/films, gaming, and browsing the web. Frequency of spending time on social media was more likely reported between 2 and 4 hours in a day (56.4%).

Correlation analysis

The relationships between all variables in the study were analyzed using the Pearson product-moment correlation coefficient technique, and the findings are presented in Table 2. There is a significant negative relationship between orthorexia nervosa scores and obsessive compulsive symptoms. This means, there is a positive correlation between obsessive compulsive symptoms and orthorexia nervosa tendency. Also, social media addiction cor-

Table 1. Prevalence of internet and social media use, purpose of internet use, time spent on social media.

N=321		N (%)
Time spent on the internet (hour/day)	0-1	3(0.9)
	2-4	83(25.9)
	5-7	162(50.5)
	>8	73(22.7)
Purpose of using internet		
To be inform of something	Yes	281(87.5)
	No	40(12.5)
Social media	Yes	281(87.5)
	No	40(12.5)
Gaming	Yes	126(39.3)
	No	195(60.7)
Communication	Yes	282(87.9)
	No	39(12.1)
Shopping	Yes	203(63.2)
	No	108(36.8)
Series/films	Yes	274(85.4)
	No	47(14.6)
Browsing the web	Yes	121(37.7)
	No	199(62.0)
Using social media	No	11(3.4)
	Yes	310(96.6)
Time spent on social media (hour/day)	Not everyday	24(7.5)
	0-1	62(19.3)
	2-4	181(56.4)
	5-7	45(14.0)
	>8	9(2.8)
Presence on social media (years)	<1	10(3.1)
	1-3	37(11.5)
	4-6	116(36.1)
	>7	158(49.2)
Ratio of social media of the time spent on the internet	A little time	99(30.8)
	Almost half	169(52.6)
	More than half	52(16.1)
	Almost all	1(0.3)

related positively with obsessive compulsive symptoms.

Mediation analysis

The findings indicated that social media addiction influenced significantly obsessive compulsive symptoms (a-path analysis) (b= .49, t = 5.02, 95% CI [.2980, .6817], p < .001). The b-path analysis revealed a significant relationship between obsessive compulsive symptoms and orthorexia nervosa tendency (b= -.07, t = -6.74, 95% CI [-.0962, -.0528], p < .001). However, there is no direct effect of social media addiction on orthorexia nervosa tendency (c'- path analysis; (b= .00, t = .04, 95% CI [-.0383, .0402], p > .05). In mediation analysis revealed that obsessive compulsive symptoms (indirect) mediated the relationship between social media addiction and orthorexia nervosa tendency (b= -.03, t = -6.74, 95% CI [-.0573, -.0187], p < .001). As a result, the mediator role of obsessive compulsive symptoms in the relationship between social media addiction and orthorexia nervosa was found significant (F (2,318) = 24.48 p < .001, R^2 = .13). All findings are shown in Table 3. Social media addiction through obsessive compulsive behavior explained a variance of 13% of orthorexia nervosa. Additionally, the direct effect of social media addiction on orthorexia nervosa is non-significant, so that obsessive compulsive symptoms fully mediated the relationship. As a result, the hypothesis is supported. Figure 2 presents all paths in the research model with unstandardized coefficients.

Table 2. Descriptive statistics and Pearson correlation coefficients for the relationships between the variables in the study

Variables	Mean	SD	**1**	**2**	**3**
1. Orthorexia nervosa	27.74	4.85	*(.74)*	-.097	-.365**
2. Social media addiction	51.96	13.16		*(.89)*	.271**
3.Obsessive compulsive symptoms	41.2	23.81			*(.94)*

** p< 0.01

Note. Coefficient alphas are presented in parentheses on the diagonal.

DISCUSSION

The current study revealed the mechanism of how

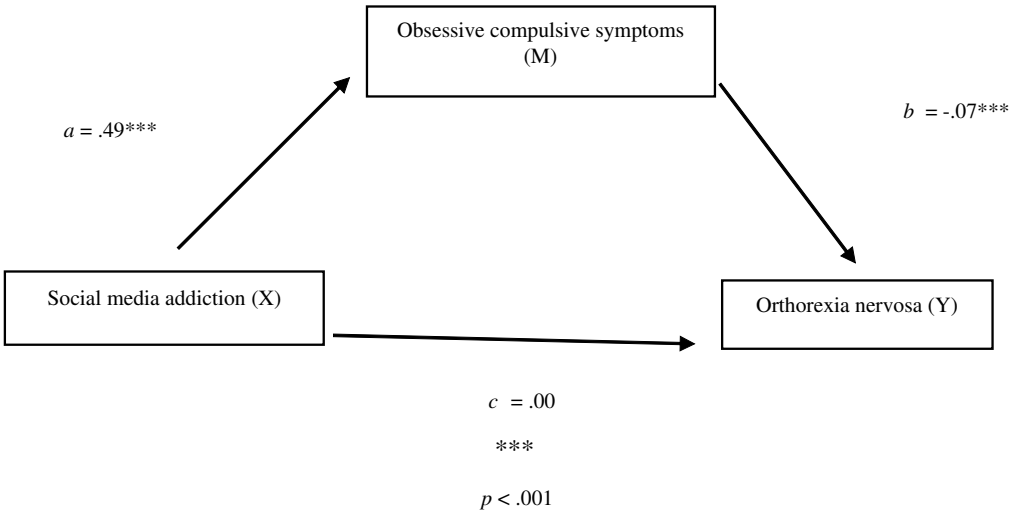

Figure 2. Mediation model

Table 3. Model coefficients for the mediation role of obsessive-compulsive symptoms relationship between social media addiction and orthorexia nervosa

	M (OCB)			Y (ON)		
Antecedents	Coeff..	*SE*	*p*	Coeff.	*SE*	p
X (Social media addiction)	.49 (*a*)	.10	.01	.00 (*c*)	.02	.96
M (Obsessive compulsive symptoms)	-	-	-	-.07 (*b*)	.01	.01
Constant	15.79	5.23	.01	30.26	1.04	.01
	R^2 = .07			R^2 = .13		
	$F_{(1, 319)}$ = 25.22, p <.01			$F_{(2, 318)}$ = 24.48, p <.01		

OCB: Obsessive Compulsive Behavior, ON: Orthorexia Nervosa

social media addiction affects the level of orthorexia nervosa. The findings underscore the complex interplay between these variables and highlight the significant role that obsessive compulsive behaviors play in the development of orthorexia tendencies among individuals with high social media addiction.

In recent years, research has shown that while the internet and social media have many positive impacts (36,37), they also have significant downsides. Studies suggest that excessive social media use can contribute to the development of new disorders or worsen pre-existing conditions, such as obsessive compulsive disorder symptoms. For instance, previous studies have established a significant link between social media use and obsessive-compulsive behaviors, particularly in the context of checking behaviors and the perceived importance of social media (38). Also, individuals with obsessive-compulsive dis are significantly influenced by social media concerning their mood and tend to place greater importance on social media than individuals of non-obsessive compulsive disorder (9). Previous research has consistently demonstrated a positive relationship between social media addiction and obsessive compulsive symptoms in various domains (16,39). For example, in romantic relationships, social media-addicted people focus on their partners' weaknesses, feel low levels of relational satisfaction, and show more relationship obsessive compulsive behaviors (40).

Building on these findings, this study identified a significant relationship between obsessive compulsive behaviors and orthorexia nervosa. Individuals exhibiting higher levels of obsessive compulsive symptoms were more likely to show orthorexia tendencies. This is consistent with previous findings (11,13), which suggest that orthorexia nervosa shares many characteristics with obsessive compulsive disorder, such as intrusive thoughts and ritualistic behaviors related to food quality and purity. The excessive focus on dietary purity can be viewed as an extension of the compulsive behaviors seen in obsessive compulsive disorder. The mediation analysis revealed that obsessive compulsive behaviors significantly mediated the relationship between social media addiction and orthorexia nervosa. This suggests that social media addiction indirectly influences orthorexia tendencies through the development of obsessive-compulsive symptoms. Additionally, no direct significant relationship between social media addiction and orthorexia nervosa indicated the full mediating effect of obsessive compulsive behaviors. The findings support the hypothesis that the compulsive use of social media contributes to the onset of obsessive-compulsive behaviors, exacerbating orthorexia behaviors. This mediation model provides a clearer understanding of how digital behaviors translate into specific eating behaviors.

Unlike previous studies, which often examined bivariate relationships (e.g., between social media addiction and orthorexia nervosa), this study employs a mediation model to uncover the underlying mechanism. In other words, this study makes a novel contribution by uncovering the mediating role of obsessive-compulsive symptoms in the relationship between social media addiction and orthorexia nervosa. While previous research has largely focused on direct relationships, the present study demonstrates that social media addiction indirectly influences orthorexia nervosa tendencies through obsessive-compulsive symptoms. This finding adds a new layer to the existing literature.

The findings of this study align with and expand upon previous research examining the relationships between social media addiction, obsessive compulsive symptoms, and orthorexia nervosa. Consistent

with earlier studies, this study identifies a significant positive correlation between social media addiction and obsessive compulsive symptoms (24,26). Clinically, the results of the present study are both expected and significant. Previous research has consistently highlighted the role of obsessive-compulsive behaviors in the development of orthorexia nervosa (41,42), as these behaviors are worsened by social media's portrayal of idealized health and beauty standards (24). This finding aligns with clinical observations where individuals presenting with orthorexia tendencies often exhibit underlying obsessive-compulsive traits. The full mediation observed in this study underlines the significant role of obsessive-compulsive symptoms as a bridge between digital behaviors and disordered eating patterns, reinforcing the importance of targeting these symptoms in clinical practice. Therefore, the findings of this study are directly applicable to clinical and public interventions, such as therapy techniques to reduce perfectionism, anxiety, and rigid thought patterns worsened by excessive social media use or regulation of social media platforms, focusing on mitigating harmful content that promotes unrealistic dietary habits and compulsive behaviors.

Despite the valuable insights provided by this study, several limitations should be noted, including the reliance on self-report questionnaires to assess both orthorexia nervosa and obsessive compulsive disorder symptoms. Future research should aim to incorporate clinical interviews or objective behavioral assessments to validate self-reported data and ensure a more comprehensive understanding of the relationship between orthorexia nervosa and obsessive-compulsive behaviors. Another limitation of this study is that information on which content pages the participants visit on social media was not collected. It is thought that exposure to social media, especially related to healthy eating, may trigger obsessive symptoms and thus increase the obsession with healthy eating. Obtaining this information in future studies can enrich the research findings.

Additionally, the study sample is limited to university students, making it difficult to generalize the findings to the broader population. University students represent a specific demographic that may experience unique pressures, such as academic stress and social influence, which could exacerbate tendencies toward disordered eating or compulsive behaviors. Future research should include a more diverse sample to enhance the validity of the findings.

A potential topic for future research is exploring how body mass index (BMI) influences the relationship between orthorexia nervosa and obsessive compulsive disorder. Although BMI was not a primary focus of this study, it may serve as a significant variable in understanding the severity of orthorexia behaviors. A comparative analysis between individuals with low and high BMI could provide insights into whether body weight influences the development or manifestation of orthorexia and obsessive compulsive tendencies. This could help tailor interventions more effectively based on an individual's BMI profile. Lastly, spending time on platforms where access to visualized posts about beauty and physical appearance is more likely to be widespread may increase risk factors of orthorexia. Therefore, future studies can investigate the effect of the type of social media platform on eating behavior.

This study shows that obsessive compulsive behaviors play a mediating role in the relationship between social media addiction and orthorexia nervosa, with the main emphasis being on the dynamics between digital media use and eating behaviors. The findings suggest that comprehensive treatment and intervention strategies addressing both the psychological effects of excessive social media use and the compulsive behaviors associated with orthore-xia nervosa are necessary. By understanding these connections, healthcare providers can create more effective interventions to target the root causes and ultimately improve outcomes for those affected.

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The effect of mental health literacy training given to primary care family health workers on stigmatization: A randomized controlled trial

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SUMMARY

Objective: There is stigma and a lack of information about individuals with mental illness among primary health care providers worldwide. The objective of this study is to evaluate the impact of a brief online training program on the mental health literacy, beliefs, and attitudes of family health workers who provide primary health care services.

Method: This study has a two-arm, parallel-group, randomized controlled design. The study involves 252 individuals who were randomly assigned to different groups. By the end of the study, 82 individuals in the intervention group and 89 individuals in the control group participated in the evaluation. Measurements: Evaluations were performed twice for both groups via pre-tests and post-tests after 3 months of follow-up following the training. The assessment utilized the Mental Health Literacy, Beliefs About Mental Illnesses, and Community Attitudes Towards Mental Illness Scales. The intervention tool of the study is mental health literacy training designed for family health workers who provide primary care services and implemented online.

Results: Data from 171 family health workers were analyzed. The mental health literacy, belief, and attitude scale scores of the participating family health workers were found to be at a moderate level. The educational intervention significantly improved mental health knowledge (p=0.029) and goodwill scores (p=0.007) in the intervention group, while reducing the perception of danger (p=0.044).

Discussion: The level of post-graduation mental health training among family health workers is low, and a significant portion are unsure whether their duties include the provision of mental health services. Primary care family health workers could benefit from a brief online training program focused on mental health literacy.

Key Words: Community health nursing, Primary health care, Mental health, Mental Health Literacy, Stigma

INTRODUCTION

Mental illness refers to a range of disorders characterized by varying degrees of inconsistencies, inappropriateness, and inadequacy in an individual's emotions, thoughts, and behaviors (1). Recent reports suggest that due to increasing stress and life difficulties in today's world, mental disorders have reached even more serious levels. Despite the existence of effective treatments for mental disorders, over 75% of individuals in low- and middle-income countries do not receive the necessary care. Several barriers impede access to effective treatment, including a lack of information about mental illnesses, limited resources, insufficient trained healthcare providers, unfamiliarity with accessing treatment, and the social stigma associated with mental disorders (2,3). Stigmatization often stems from mental illnesses not being viewed as legitimate health issues akin to physical ailments (4). Numerous studies have demonstrated that increasing awareness about mental health can boost help-seeking behaviors of individuals with mental health problems and reduce stigmatization (2,5).

The concept that heightened awareness about mental illnesses can facilitate early detection and better overall mental health has given rise to the

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notion of mental health literacy (MHL). MHL, first introduced by Jorm in 1996, is defined as the knowledge and beliefs that aid in the recognition, management, or prevention of mental disorders (6).

Healthcare professionals, given their personal and occupational responsibilities, are expected to possess strong mental health literacy. It is imperative for every healthcare provider to be equipped with the knowledge necessary to make informed decisions about health and disease. However, those working in primary healthcare services may not have the same level of current information as their counterparts in mental health. Studies indicate that mental health literacy levels among primary healthcare workers tend to be low or moderate, and they often exhibit stigmatizing behavior (7,8,9).

Yet primary healthcare plays a pivotal role in addressing mental health needs and fostering positive mental well-being. The majority of individuals with mental health issues can readily access primary care services. The World Health Organization's mental health Gap Action Program (mhGAP) and related studies are actively working to integrate mental health services into primary healthcare. Nevertheless, obstacles such as stigmatization and the lack of knowledge among primary care providers about individuals with mental illnesses hinder the success of these initiatives (10). Consequently, there is a pressing need for interventions that enhance MHL and diminish stigmatization among primary care providers (11).

In the Turkish primary care system, family physicians and family health workers (FHWs) collaborate to provide healthcare services. FHWs working in primary care play a vital role in delivering public health services, particularly for maternal and child health. FHWs maintain close ties with the public. Given the high patient load on doctors in countries like Turkey, where physicians have limited time for patient examinations, early detection of mental disorders, monitoring patient adherence to treatment, and offering appropriate counseling can contribute significantly to reducing social stigma towards individuals with mental disorders. However, the training of non-physician healthcare professionals, particularly in primary care, regarding mental illnesses, has been an overlooked issue (12). Moreover, the literature suggests that training programs designed to enhance MHL among healthcare workers lack standardization (13).

In Turkey, healthcare professionals receive basic mental health training during their undergraduate education. However, post-graduation training content aimed at increasing MHL level and reducing stigmatization is notably absent. This study introduced the first training intervention in Turkey to enhance MHL among primary healthcare workers.

The hypothesis of this study posits that a brief online training program will enhance the MHL levels of primary healthcare professionals in Turkey, positively influence their beliefs about mental illnesses, and reduce stigmatization. Specifically, it is assumed that this training program will improve participants' knowledge and beliefs regarding the recognition, management, and prevention of mental disorders, as well as foster more positive attitudes towards individuals with mental illnesses.

The primary objective of this study is to evaluate the impact of a brief online training program on the mental health literacy, beliefs, and attitudes of primary healthcare professionals. As the first educational intervention aimed at improving the mental health literacy of family health workers in Turkey, this study is expected to make a significant contribution to the healthcare education literature in the country. By assessing the effects of short-term online training programs on primary healthcare professionals, this research seeks to provide valuable insights into the effectiveness of such programs and guide the design of future educational interventions. Additionally, it may offer a new perspective to the existing literature in this field.

METHOD

Trial Design

This study utilized a two-arm, parallel-group design and was conducted as a single-blind randomized controlled trial (RCT). The reporting of the study

results adhered to the guidelines outlined in the CONSORT 2010 Statement.

Population and sample

The study population comprised a total of 438 midwives, nurses, and health officers employed at family health centers (FHCs) providing primary healthcare in Kayseri city. These healthcare professionals are commonly referred to as family health workers (FHWs). FHWs who met the inclusion criteria and agreed to participate were randomly assigned to the intervention and control group lists. This random assignment was carried out using the serial numbers in the records maintained by the city health authority. The Excel file containing the list of participants clearly delineated the order of rural and urban family physicians and districts. Computer-assisted randomization was employed to determine group allocation. It is important to note that due to the nature of the intervention, FHWs could not be blinded to their assignment in the RCT. However, to maintain the blinding of the result analysis, an independent statistician provided support.

Inclusion Criteria

1- Being employed as a family health worker in family health centers within the city of Kayseri.

2- Possessing the necessary means to access online education during designated training hours.

3- Maintaining a minimum participation rate of 90% throughout the training program.

4- Consenting to participate in the study.

It is worth noting that there were no age or gender restrictions in our study.

Exclusion Criteria

1- Refusal to participate in training and survey activities for research purposes.

2- Involvement in less than 10% of the training program.

Data collection

The preliminary and final surveys for this study were distributed to the workplaces of FHWs via corporate mail, spanning the period from August 2022 to June 2023. These surveys were subsequently collected through the same corporate mail system. The online training intervention took place in March 2023.

Measurement Tools Used in the Study

Personal Information Form: This survey, developed by the researchers for this study by reviewing the literature (8,14), includes a total of 23 questions related to personal and professional information.

Mental Health Literacy Scale (MHLS): The Turkish version of this scale, originally developed by Jung in 2016, was validated by Göktaş et al. in 2019 (15,16). The scale comprises 22 items and assesses three sub-dimensions: knowledge-oriented, belief-oriented, and resource-oriented MHL. A higher MHLS score indicates a better understanding of mental health disorders and the ability to correctly identify appropriate treatment resources. Lower MHLS scores may signify a lack of awareness about mental health disorder symptoms in oneself or others, delays in seeking professional help, seeking inappropriate help, and prematurely discontinuing treatment. Understanding the mechanisms that underlie the connection between a deficiency in MHL and the health outcomes associated with mental health disorders is essential for the implementation of interventions for individuals facing mental disorders.

Beliefs toward Mental Illness (BMI): The Turkish version of this scale, originally developed by Hirai and Clum in 2000, was validated by Bilge in 2008 (17,18). The scale is designed to assess the positive and negative beliefs held by individuals with varying cultural backgrounds regarding mental illness. It comprises 21 items organized into three subscales: dangerousness, incurability and poor social

and interpersonal skills, and shame. The dangerousness subscale examines perceptions of the danger associated with mental illnesses and patients, while the incurability and poor social and interpersonal skills subscale assesses how mental illnesses impact interpersonal relationships. The shame subscale includes items related to individuals' feelings of embarrassment about mental illnesses. The scale's interpretation considers both total scores and subscale scores, with higher scores indicating more negative beliefs.

Community Attitudes towards the Mentally Ill (CAMI): The Turkish version of this scale, originally developed by Taylor and Dear in 1979, was validated by Bağ and Ekinci in 2006 (19, 20). The scale consists of 21 items organized into three subscales: "Fear/Exclusion," "Community Mental Health Ideology," and "Goodwill." Higher total scores in the Goodwill and Community Mental Health Ideology subscales reflect a positive attitude, while a higher total score in the Fear/Exclusion subscale indicates a negative attitude.

Presentation of Training Content

The training content was developed by faculty members from Erciyes University Faculty of Medicine, encompassing the Department of Psychiatry, Department of Public Health, and Department of Medical Education. The concise training program focused on various aspects of mental health in primary care, including: identifying, assessing, and distinguishing psychiatric disorders; addressing psychiatric emergencies and criti-

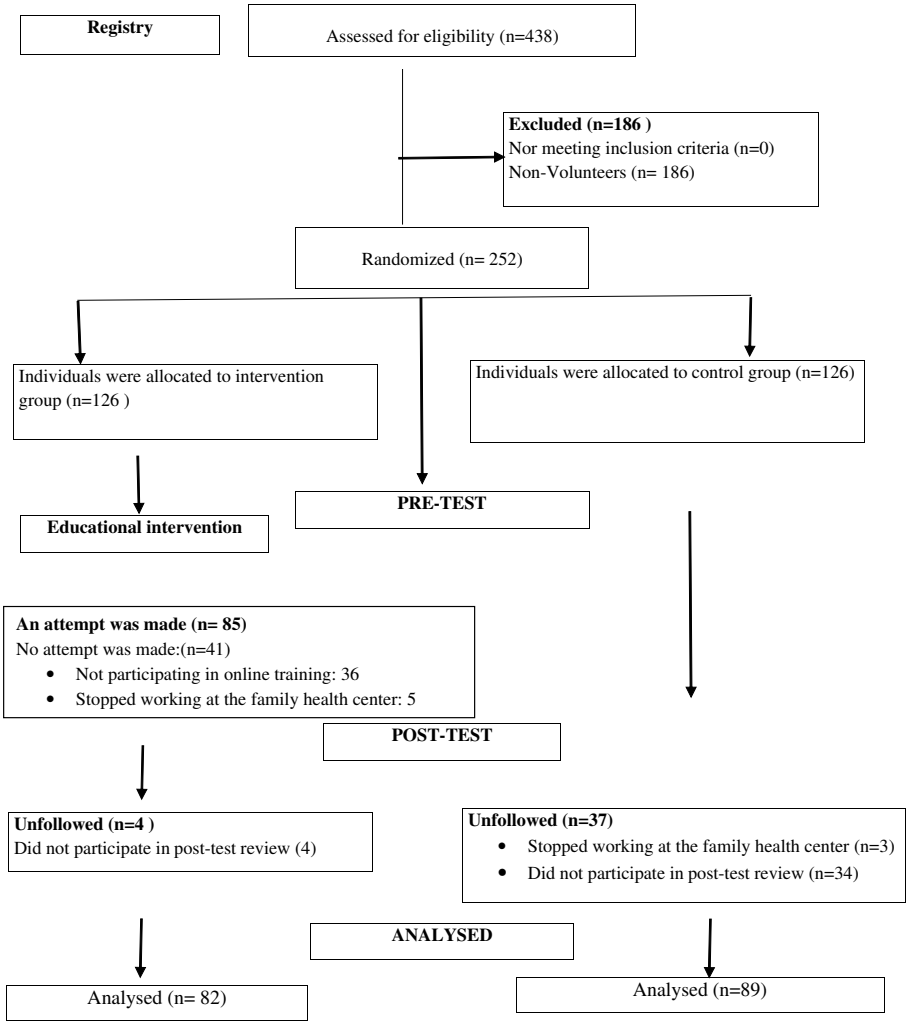

Figure 1. CONSORT flowchart.

Table 1. Demographic characteristics at baseline

	Control group (n=93)		Educational group (n=91)		Total (n=184)		t or x^2	p
Age – SS	40,23 – 5,91		38,14–7,12		39,2–6,6		t=2,143	p=0,054
Professional Year – SS	18,13 – 7,37		16,79 – 7,79		17,49 – 7,58		t=1,157	p=0,249
	n	%	n	%	n	%		
Marital status								0,294
Married	77	86,5	65	79,3	142	83,0	2,453	
Not married	12	13,4	17	20,7	29	17,0		
Family Type								
Nuclear family	82	92,1	74	90,2	156	91,2	1,793	0,616*
Extended family	4	4,5	2	2,4	6	3,5		
Alone	3	3,3	6	7,3	9	5,3		
Income status								
Income = expense	41	46,1	36	43,9	77	45,0	1,814	0,404*
Income < expense	44	49,4	38	46,3	82	48,0		
Income > expense	4	4,5	8	9,8	12	7,0		
Location of the family health center (FHC)								
Urban FHC	74	83,1	69	84,1	143	83,6	0,031	0,863
Rural FHC	15	16,9	13	15,9	28	16,4		
Profession								
Midwife	61	68,5	54	65,9	115	67,3	1,612	0,447*
Nurse	26	29,2	23	28,0	49	28,7		
Other health worker	2	2,2	5	6,1	7	4,0		
Educational status								
High school	5	5,6	10	12,2	15	8,8	5,389	0,145
2-year university	18	20,2	8	9,8	26	15,2		
Bachelor	60	67,4	57	69,5	117	68,4		
Postgraduate	6	6,7	7	8,5	13	7,6		
The situation of having mental health problems in the past								
Have	24	27,0	26	31,7	50	29,2	0,464	0,496
Have not	65	73,0	56	68,3	121	70,8		
The state of being a relative diagnosed with a mental illness								
Have	19	21,3	15	18,3	34	19,9	0,250	0,617
Have not	70	78,7	67	81,7	137	80,1		
The status of receiving primary care mental health education after graduation								
Yes	27	30,3	21	25,6	48	28,1	0,472	0,492
No	62	69,7	61	74,4	123	71,9		
The state of considering preventive mental health services as a duty								
My duty	48	53,9	48	58,5	96	56,1		
Not my duty	7	7,9	4	4,9	11	6,5	0,886	0,829
I doubt it	34	38,2	30	36,5	64	37,4		

*Fisher Test

cal situations; stress recognition and effective stress management.

For the delivery of the training content to the intervention group, the online training platform link and materials were shared with participants one day prior to the training. This information was communicated through the specified channels for those interested in the study. The training sessions were conducted online, with four sessions taking place on the same day. Each training session had an average duration of 35 minutes. Participants were encouraged to ask questions through chat and WhatsApp groups during the online sessions, and a 10-minute break was given after each session. Notably, the training occurred outside of regular working hours and on weekends.

Statistical Analysis

For demographic variables, data were presented using frequency and percentage. To assess differences between independent variables, the chi-square test or Fisher's exact test was applied. The responses to the scale items in both the pre- and post-tests were found not to follow a normal distribution ($p < 0.05$). To compare differences between groups concerning continuous variables, the Mann-Whitney U Test was used. Additionally, the Wilcoxon Matched Two-Sample Test was employed to analyze the pre-test and post-test results for dependent variables. The results were reported within a 95% confidence interval, a p-value < 0.05 was considered statistically significant. The data analysis was conducted using SPSS, version 25.0 (SPSS Inc., Chicago, IL, ABD).

Table 2. Comparison of pre-test/ post-test scales and subscale scores of FPWs in the control and experimental group

Scale	Group	Pre-test					Post-test				
		N	Mean Rank	Median (Min-max)	u	p	N	Mean Rank	Median (Min-max)	u	p
MHLS	Control	89	82,04	15(3-21)	3772,5	0,202	89	79,80	17(6-22)	3231	0,005*
	Experimental	82	90,29	16(8-22)			82	92,73	19(14-22)		
MHLS-1	Control	89	81,88	8(2-10)	3739	0,158	89	78,63	9(2-10)	3832	0,029*
	Experimental	82	90,48	9(2-10)			82	94,00	10(6-10)		
MHLS-2	Control	89	82,48	5(2-8)	3634	0,086	89	85,48	5(2-8)	3537,5	0,068
	Experimental	82	89,82	5(1-8)			82	86,56	6(2-8)		
MHLS-3	Control	89	87,71	2(0-4)	3606,5	0,071	89	75,92	3(0-4)	3605,5	0,053
	Experimental	82	84,15	3(0-4)			82	96,95	3(1-4)		
BTMI	Control	89	82,26	45(9-82)	4217	0,968	89	88,99	46(22-83)	3514,5	0,047*
	Experimental	82	90,05	44(17-76)			82	82,75	41(5-73)		
BTMI-1	Control	89	82,48	21(1-40)	4173	0,871	89	90,65	22(9-37)	3811	0,044*
	Experimental	82	89,82	23(3-38)			82	80,95	17(3-34)		
BTMI-2	Control	89	81,29	23(5-52)	4034	0,584	89	88,21	25(7-44)	3245,5	0,066
	Experimental	82	91,11	26(3-55)			82	83,60	19(7-43)		
BTMI-3	Control	89	85,74	2(1-10)	4074,5	0,651	89	90,04	2(1-7)	4017,5	0,437
	Experimental	82	86,28	2(1-10)			82	81,62	1(1-9)		
CATMHS	Control	89	89,03	51(32-67)	3796,5	0,228	89	80,38	52(36-68)	3811,5	0,233
	Experimental	82	82,71	51(34-64)			82	92,10	52(36-82)		
GCATMHS	Control	89	87,01	21(13-32)	4000,5	0,521	89	75,99	22(13-30)	4118	0,007*
	Experimental	82	84,90	21(13-28)			82	96,86	23(15-34)		
CICATMHS	Control	89	88,66	22(11-35)	3708,5	0,147	89	79,64	22(13-37)	1351	0,726
	Experimental	82	83,12	23(10-34)			82	92,90	23(13-44)		
FCATMHS	Control	89	91,09	6(3-9)	3768,5	0,187	89	98,61	6(5-10)	1811,5	0,091
	Experimental	82	80,48	6(3-10)			82	72,32	6(3-10)		

*p<0,05 / Mann -Whitney U Test. MHLS: Mental Health Literacy Scale(MHLS -1. Knowledge, MHLS-2: Belief, MHLS-3: Resource); BTMI: The Beliefs Toward Mental Illness scale (BTMI -1: Dangerousness, BTMI -2: Incurability and Social Dysfunction, BTMI -3: Embarrassment); CATMHS: Community Attitudes Toward Mental Health Scale (GCATMHS: Goodwill, CICATMHS: Community Mental Health Ideology, FCATMHS: Fear/Exclusion)

Ethical Considerations

The study was conducted in accordance with the World Medical Association Declaration of Helsinki. Permission was obtained with the decision of the Erciyes University Clinical Research Ethics Committee dated 06.10.2021 and numbered 2021/643. This study was derived from the doctoral thesis titled "Mental Health Literacy and Virtual Training Program Pilot Study in Primary Care Health Workers." The clinical trial was registered under the number ACTRN12622001223729.

RESULTS

The study initially included a total of 438 FHWs. However, 186 FHWs opted not to participate in the study, resulting in 252 participants eligible for randomization. Figure 1 illustrates the numerical changes among the participants over the course of the study. The mean age of FHWs who participated in the study was 39.2±6.6 years (control: 40.23±5.91 and intervention: 38.14±7.12). On average, they had 17.49 years of professional experience (control: 18.13±7.37 and intervention: 16.79±7.79). All FHWs included in the study were female, with 67.3% being midwives, 28.7% nurses, and 4.0% emergency medical technicians. A significant portion, 68.4%, held a bachelor's degree, and 83.6% worked in the family health center located in the city center (control: 83.1 and intervention: 84.1). Additional details regarding the demographic characteristics of the family health workers are illustrated in Table 1. The distribution of FHWs into the control and intervention groups was found to be homogenous in terms of demographic characteristics ($p > 0.05$).

In the pre-test, the mean MHLS total score for the participating FHWs was 16.0±3.50 (control: 16.01±3.57 and intervention: 15.99±3.19). The mean pre-test BMI score was 48.56±15.19 (control: 48.12±14.83 and intervention: 49.02±14.64). The mean pre-test CAMI total score was 50.01±8.39 (control: 50.61±7.60 and intervention: 49.40±8.59). According to the pre-test results, the distribution between the intervention and control groups was found to be homogeneous ($p > 0.05$).

No significant differences were observed in the pre-

Table 3. Comparison of pretest-posttest scales and subscale scores of control group FHWs (n=89)

Scales and sub-dimensions	Pre-test Mean/SD	Post-test Mean/SD	Z	Wilcoxson test P
MHLS-1	8,35–1,93	8,76–1,77	-2,051	0,152
MHLS-2	5,04–2,01	5,42–1,36	-1,529	0,126
MHLS-2	2,62–1,45	2,96–1,19	-1,88	0,261
MHLS	16,01–3,57	17,14–2,78	-4,039	0,051
BTMI-1	21,17–7,32	21,51–6,67	-1,313	0,189
BTMI-2	24,33–9,79	24,11–8,62	-1,204	0,228
BTMI-3	2,62–2,96	2,06–1,92	-1,395	0,163
BTMI	48,12–14,83	47,68–14,18	-2,593	0,210
GCATMHS	21,27–3,59	22,01–3,75	-1,36	0,174
CICATMHS	22,71–5,22	22,00–4,71	-1,348	0,178
CICATMHS	6,62–1,26	6,71–1,19	-0,796	0,426
CATMHS	50,61–7,60	50,72–7,01	-0,076	0,939

*p<0,05 / Wilcoxson test. MHLS: Mental Health Literacy Scale(MHLS-1. Knowledge, MHLS-2: Belief, MHLS-3: Resource); BTMI: The Beliefs Toward Mental Illness scale (BTMI-1: Dangerousness, BTMI-2: Incurability and Social Dysfunction, BTMI-3: Embarrassment); CATMHS: Community Attitudes Toward Mental Health Scale (GCATMHS: Goodwill, CICATMHS: Community Mental Health Ideology, FCATMHS: Fear/Exclusion)

Table 4. Comparison of pretest-posttest scales and subscale scores of intervention group FHWs (n=82)

Scales and sub-dimensions	Pre-test Mean/SD	Post-test Mean/SD	Wilcoxson test Z	Wilcoxson test P
MHLS-1	8,58–1,55	9,37–1,04	-4,453	0,001
MHLS-2	5,02–1,95	5,15–2,05	-0,526	0,599
MHLS-2	2,39–1,41	3,46–0,97	-5,187	0,001
MHLS	15,99–3,19	18,0–2,30	-5,502	0,001
BTMI-1	21,82–7,17	20,88–4,66	-1,620	0,025
BTMI-2	24,78–9,56	24,42–8,30	-1,259	0,208
BTMI-3	2,40–3,11	2,28–2,18	-1,538	0,161
BTMI	49,02–14,64	47,58–12,27	-0,548	0,053
GCATMHS	21,07–3,41	23,74–3,5	-4,759	0,001
CICATMHS	22,01–6,19	23,32–4,09	-1,44	0,151
CICATMHS	6,31–1,34	5,63–1,72	-3,143	0,002
CATMHS	49,40–8,59	52,70–6,43	-2,657	0,008

*p<0,05 / Wilcoxson test. MHLS: Mental Health Literacy Scale(MHLS-1. Knowledge, MHLS-2: Belief, MHLS-3: Resource); BTMI: The Beliefs Toward Mental Illness scale (BTMI-1: Dangerousness, BTMI-2: Incurability and Social Dysfunction, BTMI-3: Embarrassment); CATMHS: Community Attitudes Toward Mental Health Scale (GCATMHS: Goodwill, CICATMHS: Community Mental Health Ideology, FCATMHS: Fear/Exclusion)

test and post-test results for MHLS, BMI, CAMI scales, and their respective subscales among the FHWs in the control group ($p < 0.05$) (Table 3).

According to the post-test results of FHWs in the intervention group, there was an increase in the mean total MHLS score ($p=0.001$) and the MHLS sub-dimensions of knowledge ($p=0.001$) and resources ($p=0.001$) compared to the pre-test results, with a statistically significant difference ($p<0.05$). There was no difference between the mean scores of the belief subscale ($p = 0.599$). According to the post-test results of FHWs in the intervention group, there was a difference between the mean scale scores of total BMI ($p = 0.053$) and dangerousness ($p = 0.025$), one of the BMI sub-dimensions ($p < 0.05$). The mean score differences in the incurability and poor social and interpersonal skills ($p=0.208$) and shame ($p=0.161$) subscales were not found to be significant ($p>0.05$). According to the post-test results for the CAMI scale, the change in the mean scores of the total scale ($p=0.008$), goodwill ($p=0.001$), and fear ($p=0.002$) subscales was significant ($p<0.05$). The increase in scores in the ideology sub-dimension ($p=0.151$) was not significant ($p>0.05$).

The mean post-test total MHLS score for FHWs who participated in the study was found to be 17.57±2.67 (control: 17.16±2.78 and intervention: 18.0±2.30). Notably, there were differences between the post-test scores of the total MHLS ($p=0.05$), the knowledge sub-dimension (0.029), and the resource sub-dimension (0.053) of FHWs in the control and intervention groups ($p<0.05$). However, there was no significant difference in the post-test results for the belief sub-dimension ($p=0.068$) mean scores between the control and intervention groups ($p>0.05$). Regarding the BMI scale, the mean post-test total BMI score for FHWs in the study was 47.66±13.15 (control: 47.68±14.18 and intervention: 47.58±12.27). There was no significant difference between the mean scores for the BMI total scale ($p=0.147$), the incurability and poor social and interpersonal skills ($p=0.066$), and the shame ($p=0.537$) subscales ($p>0.05$). However, a difference was observed between the control and intervention groups regarding the dangerousness sub-dimension of this scale ($p = 0.044$). For the CAMI scale, the mean post-test total CAMI score was 51.67±8.95 (control: 50.72±7.01 and intervention: 52.70±6.43). There was no significant difference between the mean scores for the total CAMI ($p=0.233$), the ideology ($p=0.726$), and the fear ($p=0.091$) subscales between the control and intervention groups ($p<0.05$). However, the goodwill sub-dimension of the CAMI scale exhibited a significant increase in the intervention group ($p=0.007$).

DISCUSSION

The mean MHLS, BMI, and CAMI scores for FHWs who participated in this study were found to be at a moderate level compared to the pre-test results. In the MHLS scale, the sub-dimension with the highest mean score was knowledge, while the belief dimension had the lowest mean score. The resource subscale score, which represents help-seeking behavior, is at a moderate level. In Öztaş's study, non-physician healthcare personnel working in hospitals had a moderate level of mental health

literacy. It was noted in the same study that the mean MHLS score of midwives was lower than that of nurses (21). In Uymaz's study, it was reported that the mental health literacy level of midwives was lower than desired (22). Results from different scales measuring MHL among healthcare personel globally have shown varying levels. In some regions, such as China and the Arabian Peninsula, the MHL level of healthcare personnel has been reported to be low (23, 24). Conversely, in South Africa and Zambia, a moderate level of MHL has been reported among primary healthcare workers (25, 26).

In Australia, some undergraduate nursing students indicated that they were not proficient in MHL. They expressed a need for more information about various aspects of mental health, including types of mental illnesses, treatments, stigma reduction, and communication with individuals with mental illnesses (27). However, a study conducted in South Africa found that nursing students generally exhibited a good level of knowledge about mental disorders, continued to seek appropriate help, and held positive attitudes towards mental illness (28).

The first point of contact for individuals with any kind of health issue is primary healthcare facilities. Healthcare personnel are expected to have sufficient knowledge about general mental health, especially considering the groups they primarily serve. A distinct evaluation related to mental health found that the perinatal depression literacy level of health workers providing primary care is at a moderate level (29).

It has been suggested that beliefs can be predictive of behaviors. The beliefs that FHWs hold about mental illnesses can have a profound impact on the counseling, guidance, and care they provide to individuals with mental health issues. For instance, in Israel, it was reported that nurses caring for women with severe postpartum mental illness provided less routine postpartum care due to stigmatization and negative attitudes towards parenting skills (30).

When evaluating the attitudes and beliefs of FHWs who participated in our study, it was found that they held more positive beliefs compared to the results of other studies conducted using the same scale in Turkey (31,32,33,34,35). However, globally, healthcare professionals have been reported to often exhibit rejecting and exclusionary attitudes toward psychiatric patients and their illnesses (36).

Undoubtedly, past experiences have a significant influence on healthcare professionals' attitudes towards mental health issues. Studies have shown that nurses' stigmatizing behaviors can stem from their personal experiences, which can lead to consequences such as their reluctance to work with mental patients. However, these same studies have revealed that increasing mental health knowledge and spending more time with mental patients can reduce stigmatizing behavior (37,38,39).

Our study showed that the training provided to FHWs had a positive impact on the total MHLS score, as well as the knowledge and resource subdimensions. However, its effect on the belief subdimension was relatively low. Numerous studies worldwide have demonstrated that educational interventions using various methods to enhance the mental health literacy of healthcare personnel are effective, which aligns with the results of our study (25,26,27,40).

Similarly, our training intervention was found to positively affect the dangerousness sub-dimension of the BMI scale and the sub-dimensions of goodwill and fear within the CAMI scale. The belief that individuals with mental disorders pose a threat to society and are dangerous is a component of stigmatizing behavior. To foster a positive attitude, it is crucial to accurately convey the idea that mental patients are not dangerous and should not be feared. The increase in scores in the goodwill subdimension is also a favorable outcome, promoting the belief in the right of mental patients to receive treatment. However, the educational intervention was not observed to have a significant impact on the total BMI, incurability and poor social and interpersonal skills, shame, and ideology subdimensions. Consistent with our results, the literature review reveals that brief anti-stigma training interventions may not be sufficient. Relevant studies have reported that short educational interventions have little or no effect, while longer-term edu-

cational interventions that use mixed methods tend to be more effective (38,41,42,43).

In light of theory and research suggesting that beliefs and attitudes are powerful drivers of behavior, changing attitudes can be an effective strategy for behavior change (44). The literature also indicates that, to alter attitudes and beliefs effectively, it can be beneficial to start by addressing or modifying individuals' existing habits (45).

However, changing habitual behaviors, especially those developed in a work environment influenced by colleagues, can be challenging, as healthcare professionals often rely on established routines. To foster positive changes, health authorities must implement in-service training programs that are both consistent with expectations and part of the routine. It is noteworthy that in our study, only 28.1% of FHWs had received postgraduate mental health training, and nearly half of them had a responsibility to provide preventive mental health services. In Turkey, the Ministry of Health offers video-based training content to FHWs on topics like combating domestic violence against women and the psychosocial development of children. However, there is currently no standardized training program to enhance MHL in primary care.

In conclusion, approximately 75% of FHWs lack postgraduate mental health training, and many are unsure about their role in providing preventive mental health services in primary care. The short-term MHLS training program we conducted successfully increased the overall MHLS level among FHWs. However, the impact of this brief educational intervention on the BMI and CAMI levels, particularly in terms of reducing stigmatization, was relatively low. To promote a more positive attitude toward individuals with mental health issues, it is advisable to organize routine in-service and postgraduate training programs that address the issue of stigmatization.

Limitations of the Study

This study specifically targeted FHWs employed in family medicine units within a single city. The research was carried out only with those who agreed to participate in the study. The fact that the participants were volunteers may have led to the participation of people with more positive attitudes, especially regarding beliefs about mental illness and the community attitudes scale. The study is limited to the results of the MHLS, the CAMI, and the BMI Scales together with the subscales of these scales. The education was designed as a pilot study since no exemplary education model was implemented in Turkey. Since the education was conducted online, the listening quality of the participants may differ.

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Mediating role of self-compassion on the relationship between early maladaptive schema domains and secondary traumatic stress of refugee aid workers

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SUMMARY

Objective: Refugees are often exposed to various traumatic experiences before, during, and after migration. Refugee aid workers may also be indirectly affected by these traumatic experiences. The present study aims to examine the mediating role of self-compassion in the relationship between early maladaptive schema domains and secondary traumatic stress in refugee aid workers.

Method: This correlational study included 116 participants from different institutions in Turkey, who participated voluntarily. The sample included 83 (71.6%) female and 33 (28.4%) male participants. Their age range was between 23 and 64 (M = 29.6, SD = 5.5). Data were collected using the Turkish versions of the Young Schema Questionnaire-Short Form Version 3 (YSQ-SF3), the Secondary Traumatic Stress Scale (STSS), and the Self-Compassion Scale (SCS).

Results: The findings showed that self-compassion significantly mediated the relationship between disconnection and rejection [(b =.133, 95% BCA CI (.0605,.2199)], impaired autonomy and performance [(b =.087, 95% BCA CI (.0221,.1672)], other-directedness [(b =.247, 95% BCA CI (.1117,.3997)], and unrelenting standards schema domain [(b =.246, 95% BCA CI (.1031,.3830)] with secondary traumatic stress (STS). Self-compassion had a medium to large effect size on the relationship between each schema domain, except for Impaired Limits, and secondary traumatic stress in refugee aid workers.

Discussion: These findings offer preventative insights into secondary traumatic stress, a common psychological issue among refugee aid workers. The results suggest that in-service training and interventions focused on self-compassion can help prevent secondary traumatic stress in these workers. Additionally, schema therapy may be an effective intervention for aid workers struggling with secondary traumatic stress.

Key Words: Secondary traumatic stress, schema domains, self-compassion

INTRODUCTION

Both directly experiencing a traumatic event and learning about a significant other's traumatic experience leave scars in people's lives, which may lead to natural emotional and behavioral responses. This indirect experience is called secondary traumatic stress (STS) (1). Stress in secondary trauma arises from caring for a traumatized person who needs help (2). Exposure to others' traumatic experiences may result in emotional exhaustion and burnout. Therefore, Figley (1) mentioned that this exhaustion and burnout could lead to secondary traumatic stress disorder.

Social workers are particularly vulnerable to STS due to frequent exposure to traumatized individuals (3). They often assist vulnerable groups, including survivors of childhood abuse, natural disasters, and war (3). Working with such groups may lead to compassion fatigue, characterized by re-experiencing traumatic events, avoidance, and heightened arousal (4). Lee et al. (5) demonstrated that clinical workers exposed to trauma frequently experience these symptoms, negatively impacting their physical and mental wellbeing. For these reasons, STS among social workers is a critical issue that warrants attention.

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Many personal factors affect the likelihood of experiencing secondary traumatic stress. Although studies on STS show varying results regarding sociodemographic variables, gender (6, 7), age (8), education (8, 9), experience level (8, 10), frequency of exposure (8, 11), receiving training or supervision (12), and sense of competence (13) appear to play a role in experiencing STS.

Since self-compassion is shown to improve psychological well-being (14–16), it may be argued that self-compassion may buffer negative effects of STS. Self-compassion, rooted in Eastern philosophy but more recently explored in Western psychology, enables individuals to address their pain with kindness (17). Neff (17) conceptualized self-compassion as comprising three elements: self-kindness, a sense of common humanity, and mindfulness. These elements interact to foster resilience. For example, mindfulness reduces self-criticism and promotes selfunderstanding (18), while also cultivating a balanced perspective, reducing feelings of isolation, and strengthening interconnectedness (19, 20).

Numerous studies have examined the relationship between self-compassion and wellbeing. Self-compassion is negatively associated with anxiety, depression, and stress (21). MacBeth and Gumley (14) reported strong correlations between self-compassion and reduced psychopathology. Wu et al. (22) highlighted its protective effects against depression stemming from childhood maltreatment. High levels of self-compassion are also linked to happiness and psychological strengths (21, 23–26). Collectively, these findings suggest that self-compassion plays a vital role in well-being.

The concept of schema, which is central to the current investigation, is defined as a pattern that mediates perception, guides reactions to experiences, and affects how one perceives reality. It consists of "an abstract representation" of different features (27). A schema can be adaptive or maladaptive. Early Maladaptive Schemas (EMS) is defined as a "broad, pervasive pattern that consists of memories, emotions, cognition, and bodily sensations" (27). This pattern develops during childhood or adolescence and can be shaped and detailed by experiences throughout life. EMS is seen as "self-defeating emotional and cognitive patterns" (23). Young theorizes maladaptive behaviors are responses developed due to schemas, but they are not a part of schemas themselves (27).

The 18 schemas are divided into five schema domains categorized by unfulfilled emotional needs (27). The disconnection and rejection domain is explained by the inability to establish secure bonds with others and experience satisfying relationships. The impaired autonomy and performance domain is summarized as difficulties in differentiating themselves from their parent figures or important others and behaving independently (27). Impaired limitsdomain means having difficulties in creating internal limits adequately for reciprocity or selfdiscipline. The other-directedness domain is explained as people overestimating others' needs to gain approval. Over vigilance and inhibition domain is explained as repressing natural feelings and impulses. People with schemas from this domain have unchangeable internalized rules about their actions (27).

Aid workers supporting refugees and asylum-seekers face a heightened risk of STS due to exposure to trauma (28). Considering positive effects of self-compassion on psychological health (14, 15, 21), it is plausible that self-compassion may also be protective against STS. Additionally, EMS are linked to mental health issues like depression and anxiety (29–32). Studies suggest self-compassion mediates the relationship between maladaptive schemas and psychological distress (33–35, 37, 38).

The current study aims to examine the mediating role of self-compassion in the relationship between EMS domains and STS of refugee aid workers. The proposed model of this study is represented in Figure 1. This research addresses a critical gap in understanding the psychological mechanisms underlying STS in this high-risk group and highlights potential interventions, such as schema therapy and self-compassion practices, to improve their wellbeing. Findings could inform programs aimed at reducing STS prevalence among refugee aid-workers.

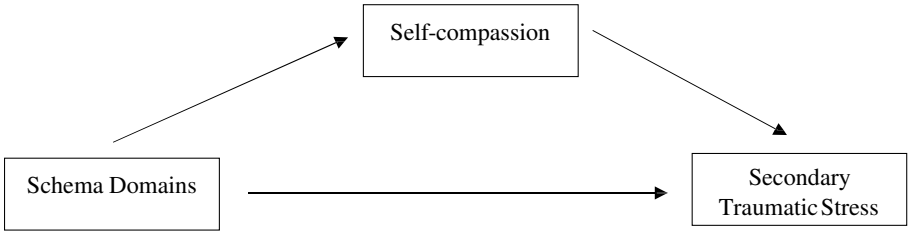

Figure 1. The mediation role of self-compassion on the relationship between early maladaptive schema domains and secondary traumatic stress.

This study also explores the relationship between early maladaptive schema domains, self-compassion, and secondary traumatic stress. Additionally, it examines whether secondary traumatic stress varies based on demographic variables. It was hypothesized that there is a significant negative relationship between early maladaptive schema domains and self- compassion, and that secondary traumatic stress is significantly and negatively correlated with self-compassion. In other words, it was anticipated that experts with higher levels of self-compassion would be better equipped to cope with the challenges of working with traumatized populations.

Furthermore, it was expected that there is a significant positive relationship between early maladaptive schema domains and the secondary traumatic stress experienced by refugee aid workers. Lastly, the significance of the proposed model was tested. It was hypothesized that secondary traumatic stress is predicted by early maladaptive schema domains, with self- compassion serving as a mediator. In other words, early maladaptive schema domains were thought to increase secondary traumatic stress by reducing self-compassion.

METHOD

Sample and Procedure

Refugee aid workers were randomly contacted, and their participation was entirely voluntary. There were some challenges in reaching participants, which likely impacted the total number of respondents. For instance, temporary lockdowns during the COVID-19 pandemic hindered face-to-face data collection and limited access to potential participants. Approximately 5% of the participants were recruited through face-to-face interactions at refugee aid organizations. The remaining participants were invited to take part via an online survey using Qualtrics. The survey link was shared only with those who expressed a willingness to participate, ensuring both randomness and ethical compliance in recruitment.

It was also noted that refugee aid workers were hesitant to participate in research due to institutional policies. A total of 116 refugee aid workers, engaged either in fieldwork or office- based tasks with traumatized individuals, took part in the study. Purposive sampling was employed to select participants. All participants were informed about the purpose of the study. No diagnostic criteria were applied to participants in this study. All participants had at least a bachelor's degree. The sample consisted of 83 females (71.6%) and 33 males (28.4%), with ages ranging from 23 to 64 years (M = 29.6, SD = 5.5).

Regarding occupational distribution, 28.44% of

Table 1. Demographics of the Participants

		N	%
Sex	Male	33	28,4
	Female	83	71,6
Age	22-30	86	74,1
	31-40	26	22,4
	41-above	4	3,4
Educational Status	Undergraduate	76	65,5
	Postgraduate	33	28,4
	Doctorate	7	6
Workplace	Non-Governmental Organization	99	85,3
	Governmental Organization	17	14,7
Working Environment	Office	84	72,4
	Field	32	27,6
Work Experience	Less than 1 year	45	38,8
	1-3 Years	42	36,2
	More than 3 years	29	25
Exposure time (Weekly)	Less than 10 hours	25	21,6
	11-20 hours	15	12,9
	More than 21 hours	76	65,5
Inservice-Training	Yes	84	72,4
	No	32	27,6
Perceived Competence	Completely Incompetent	0	0
	Incompetent	8	6,9
	Average	33	28,4
	Competent	58	50
	Completely Competent	17	14,7

participants were psychologists (33 individuals), 18.10% were social workers (21 individuals), 12% were teachers (14 individuals), 10.34% were administrative personnel (12 individuals), and 0.8% were experts such as support personnel. Detailed demographic information is presented in Table 1.

All procedures performed in this study followed the ethical standards of the Baskent University Social and Humanities and Arts Research Committee (19296 & 2019. 05.23) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The questionnaire consisted of 133 items. Data was collected using either an online or paper- pencil method, with the online part administered via Qualtrics. All participants completed the survey anonymously. Data was collected in the years between 2019 and 2020. IBM SPSS Statistics 24.0 package software and Process Macro for SPSS (Process v3.5) were used for data analysis.

Measurements

Demographic questionnaire: The demographic questionnaire included items on gender, age, education level, department of graduation, type of institution (e.g., non-governmental organization or governmental institution), professional role, work environment, duration of experience with traumatic groups (measured in months), daily and weekly exposure (measured in hours), in- service training, and perceived self-competence.

Self-compassion Scale (SCS): The Self-Compassion Scale (SCS) was developed by Neff (37). This scale consists of six subdimensions: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Scores are calculated for each subdimension as well as an overall score. Total scores range from 1 to 5, with scores between 1 and 2.5 indicating lower self-compassion and scores between 3.5 and 5 indicating higher self-compassion. Higher scores in each subscale reflect greater alignment with the respective characteristic. The Turkish adaptation of the SCS was conducted by Akın et al. (2007), with internal consistency coefficients ranging from .72 to .80. In the current study, Cronbach's alpha values for the subdimensions were .84, .85, .73, .72, .78, and .74, respectively. The Cronbach's alpha for the total scale was calculated as .94.

Table 2. Turkish Adaptation of Early Maladaptive Schemas by Soyg t et al. (41)

Schema Domains	Early Maladaptive Schemas
Disconnection and Rejection	Emotional Deprivation
	Emotional Inhibition
	Social Isolation/ Mistrust
	Defectiveness
Impaired Autonomy and Performance	Enmeshment/ Dependency
	Abandonment
	Failure
	Pessimism
	Vulnerability to Harm
Impaired Limits	Insufficient Self-Control/ Self-Discipline
Other-Directedness	Self-Sacrifice
	Punitiveness
Unrelenting Standards	Unrelenting Standards
	Approval-Seeking

Secondary Traumatic Stress Scale (STSS): The STSS was originally developed by Bride et al. (39) to measure secondary traumatic stress (STS). It comprises three subdimensions: intrusion, avoidance, and arousal, with higher scores indicating greater STS severity. The Turkish adaptation was performed by Kahil and Palabıyıkoğlu (40), who reported a one-dimensional structure for the scale in the Turkish context. The internal consistency coefficient for the entire scale in their study was .94. In the current study, Cronbach's alpha coefficient for the STSS was calculated as .93.

Young Schema Questionnaire- Short Form Version 3 (YSQ-SF3): The Young Schema Questionnaire (YSQ) was originally developed by Young in 1990 to assess early maladaptive schemas. This study utilized the third short form (YSQ-SF3). Soygüt et al. (41) conducted the Turkish adaptation, which identified five schema domains and 14 schema dimensions adapted to Turkish culture (Table 2). Although the number of items remained unchanged, their distribution differed from the original version. Internal consistency coefficients for the schema dimensions ranged from .67 to .81, while those for the schema domains ranged from .70 to .90. In the current study, Cronbach's alpha values for schema dimensions ranged from .74 to .93, schema domains from .74 to .94, and the total scale from .97.

Table 3. Descriptive Statistics

Variable	*M*	*SD*	Min	Max	Skewness	Kurtosis
SCS Total Score	3.5	.63	2.01	4.96	-.33	-.45
STSS Total Score	37.09	12.48	17	78	.62	.09
YSQ-SF3 Disconnection and rejection	49.56	19.18	23	113	1.04	.80
YSQ-SF3 Impaired autonomy and performance	61.43	22.42	30	123	.82	.03
YSQ-SF3 Impaired limits	23.60	6.56	7	42	.03	.08
YSQ-SF3 Other-directedness	35.61	9.37	11	61	-.13	-.10
YSQ-SF3 Unrelenting standards	27.79	8.56	9	53	.47	.11

Statistical Analysis

Prior to conducting statistical analyses, assumptions were tested, including independence of residuals, absence of multicollinearity, homoscedasticity, normality, linearity, and detection of outliers. After verifying these assumptions, analyses were conducted using independent sample t-tests and correlation analysis. Additionally, a mediation model was tested.

RESULTS

Descriptive Statistics

Descriptive statistics related to the study variables are represented in Table 3.

Inter-correlations among Variables

The Pearson Correlation Analysis was conducted to examine the relationships between the main variables of this study: early maladaptive schema domains, self-compassion, secondary traumatic stress, gender, and work experience. The results of the correlation analysis are presented in Table 4.

Comparison of Secondary Traumatic Stress in Terms of Demographic Variables

Independent sample t-tests were performed to determine whether there were significant differences in STS based on gender, age, receiving in-service training, education level, sense of competence, and work experience. The results showed that there was no significant difference in STS based on gender ($t(114)= 1.86$, $p> .05$), age ($t(114)= -1.74$, $p> .05$), education level ($t(114)= -.511$, $p> .61$), sense of competence ($t(114)= 1.21$, $p> .05$), and work experience ($t(114)= -1.58$, $p> .05$). On the other hand, there was a significant difference ($t(114)= -3.19$, $p<.05$) between participants who had received in-service training ($M=34.89$, $SD=11.79$) and those who had not ($M=42.84$, $SD=12.57$). Refugee aid workers who received in-service training had significantly lower scores on the secondary traumatic stress scale than those who did not. Results of the independent sample t-test analysis are presented in Table 5.

Mediation Analysis

In the current study, the main aim was to examine whether self-compassion mediated the relationship between early maladaptive schema domains and secondary traumatic stress. In tested model, independent variables were EMS domains (Disconnection and Rejection, Impaired Autonomy and Performance, Impaired Limits, Other-Directedness, and Unrelenting Standards), the dependent variable was STS, and the mediation variable was self-compassion. Therefore, five different mediation models would be designed to test all EMS domains.

Mediation models were tested with Model 4 by

Table 4. Inter-correlations among Variables

Variables	*M*	*SD*	1	2	3	4	5	6	7	8
1. *Working Experience*	26.82	26.83	-							
2. *Disconnection and rejection*	49.56	19.18	.01	-						
3. *Impaired autonomy and performance*	61.43	22.42	.07	.80**	-					
4. *Impaired limits*	23.60	6.56	.00	.39**	.35**	-				
5. *Other-directedness*	35.61	9.37	.18*	.47**	.60**	.44**	-			
6. *Unrelenting standards*	27.79	8.56	.01	.56**	.65**	.49**	.64**	-		
7. *STSS Total Score*	37.09	12.48	.18*	.36**	.49**	.14	.35**	.41**	-	
8. *SCS Total Score*	3.50	.63	-.04	-.57**	-.63**	-.19*	-.48**	-.52**	-.47**	-

Note. SCS: Self-compassion Scale, STSS: Secondary traumatic stress scale, N = 116 *p< .05, **p< .01

Table 5. Results of Demographic Variable Differences on STS Using Independent Sample T-test

Variable	Groups	*n*	*M*	*SD*	*t*	*p*
Secondary Traumatic Stress	Female	83	38.43	12.60	1.86	.065
	Male	33	33.70	11.68		
Secondary Traumatic Stress	Younger	59	35.12	10.90	-1.74	.084
	Older	57	39.12	13.72		
Secondary Traumatic Stress	In-service training	84	34.89	11.79	-3.19	.002
	No training	32	42.84	12.57		
Secondary Traumatic Stress	Undergraduate	76	36.62	11.22	-.511	.61
	Post-graduate	40	37.98	14.69		
Secondary Traumatic Stress	Less competent	41	38.98	13.33	1.208	.229
	More competent	75	36.05	11.95		
Secondary Traumatic Stress	Less experienced	72	35.67	11.55	-1.58	.117
	More experienced	44	39.41	13.69		

using SPSS Process macro version 3.5, developed by Hayes (42). Each of them was tested via regression analysis based on the bootstrap method. It is argued that the bootstrap method is more reliable than Baron and Kenny's traditional method and the Sobel Test (43, 44, 45, 46). In the current analyses, the bootstrap method with 5000 re-samplings were chosen and 95% confidence interval (CI) was used (47). The effect size of mediation models was interpreted following K^2 values. K^2 is calculated at approximately .01, .09, or .25 means small, medium, or high (48).

After statistically controlling covariates (gender and working experience), all models were tested. In Model 1, it was discovered that self-compassion significantly mediated the relationship between disconnection and rejection schema domain and STS as expected [(b =.133, 95%BCA CI (.0605, .2199)]. It was also found that the total model is significant [F (3,112) = 7.21, p < .001], and it explains 19% of secondary traumatic stress (R^2=.19).

In Model 2, as it is expected, self-compassion significantly mediated the relationship between impaired autonomy and performance domain and STS [(b = .087, 95%BCA CI (.0221, .1672)]. It was also found that the total model is significant [F (3,112) = 10.74, p < .001], and it explains 28% of STS (R^2=.28).

In Model 3, it was found that the relationship between impaired limits and STS was not mediated by self-compassion [b=.148, 95%BCA CI (-.0294, .3519)]. The total model was found significant [F (3,112) = 3.08, p < .05], and it explains 8% of STS (R^2=.08).

In Model 4, it was discovered that the relationship between the other-directedness domain and STS was mediated by self-compassion supposedly [(b = .247, 95%BCA CI (.1117, .3997)]. The total model was found significant [F (3,112) = 5.57, p < .01], and it explains 15% of STS (R^2=.15).

Finally, in Model 5, it was found that there was a mediating role of self-compassion in the relationship between unrelenting standards schema domain and STS expectedly [(b = .246, 95%BCA CI (.1031, .3830)]. The total model was significant [F (3,112) = 7.44, p < .001], and it explains 21% of STS (R^2 = .21). In addition to all findings reported in the result section, coefficients and confidence intervals related to all mediation models are presented in Table 6.

DISCUSSION

The present study aimed to examine whether self-compassion mediates the relationship between early maladaptive schema domains and secondary traumatic stress (STS) in refugee aid workers. The

Table 6. Related Values for Mediating Role of Self-compassion on the Relationship between Early Maladaptive Schema Domains and Secondary Traumatic Stress

Mediation Models	Coefficients		%95 BCA Confidence Interval	
	B	SE	Low	High
Disconnection and Rejection >> Self-compassion >> Secondary Traumatic Stress	.13*	.04	.0049	.2199
Impaired Autonomy and Performance >> Self-compassion >> Secondary Traumatic Stress	.09*	.04	.0221	.1672
Impaired Limit >> Self-compassion >> Secondary Traumatic Stress	.15	.10	-.0294	.3519
Other-directedness >> Self-compassion >> Secondary Traumatic Stress	.25*	.07	.1117	.3997
Unrelenting Standards >> Self-compassion >> Secondary Traumatic Stress	.25*	.07	.1031	.3830

Note. B= Non-standardized beta coefficient, SE= Standard error, BCA= Bias corrected and accelerated, *= Mediation effect is significant

results showed that participants with higher levels of EMS domains tended to have lower levels of self-compassion. Early adverse experiences, which are argued to be the source of EMS (26, 27), pose a threat to the existence of self-compassion. Therefore, the findings of the present study are consistent with the existing literature regarding EMS and self- compassion relationship (33, 34, 35).

Although several studies have examined the relationship between EMS or its domains and symptoms of psychopathology (34), well-being (49), psychological distress (33), and depression (50), the topic of STS has not been examined in terms of EMS or schema domains. Some studies have explored the effectiveness of schema therapy on PTSD. For example, Cockram et al. (51) investigated whether EMS was beneficial for understanding and treating PTSD, reporting that veterans with PTSD exhibited significantly higher levels of vulnerability to harm and emotional inhibition schemas. Veterans treated with schema therapy showed more improvement in PTSD and anxiety symptoms than those treated with manualized cognitive- behavioral therapy. Given the similarities between PTSD and STS, it can be stated that the relationship between EMS and STS is supported by other studies as well.

The findings also indicated that as self-compassion increases, STS decreases. This can be explained by the role self-compassion plays in moderating reactions to adverse events. Neff and Costigan (21) suggested that individuals with higher self-compassion experience fewer extreme reactions to negative events. Additionally, self-compassion decreases negative emotions and increases the ability to accept thoughts and reflect on problems (52).

Analyses of demographic variables on STS revealed that receiving in-service training while working with traumatized groups was found to be effective in reducing participants' STS levels. This finding is consistent with the prior research (12, 53). This highlights the importance of targeted interventions and training programs to equip individuals with the skills to manage STS, emphasizing the role of preparedness in mitigating its effects.

Five mediation models were constructed for each schema domain, and findings were interpreted separately. The results revealed that the relationship between the Disconnection and Rejection Schema Domain and STS was mediated by self-compassion. This domain involves a lack of stability, safety, love, nurturance, and belonging. People with this schema believe that their needs for empathic relationships, sharing of feelings, acceptance, and respect will not be predictably met (27). Considering the characteristics of this domain, it can be inferred that people who did not learn empathy, compassion, and acceptance from their parents during childhood may struggle with self-compassion. Therefore, the Disconnection and Rejection Schema Domain may predict a low level of self-compassion.

The Impaired Autonomy and Performance Schema Domain's relationship with STS was also mediated by self-compassion. This domain is associated with difficulties differentiating oneself from significant others and behaving independently. People in this domain may have been overprotected or neglected during childhood (27). These individuals may have difficulty separating themselves from their clients' traumatic experiences, which can increase the likelihood of suffering from STS.

However, the mediating role of self-compassion in the relationship between Impaired Limits and STS was insignificant. People with schemas from this domain were exposed to highly permissive and indulgent parents when they were children. Their characteristic features are stated difficulties in creating adequate internal limits for reciprocity and respecting the rights of others. Selfishness, pertness, and narcissism are commonly seen in this domain (27). Because of these features, it may not be found to predict self-compassion and STS significantly.

The relationship between the other-directedness schema domain and STS was mediated by self-compassion. In this domain, people prioritize others' needs over their own to gain approval, maintain emotional connections, or avoid retaliation. Due to this excessive focus on others' needs, they may have reduced self-awareness regarding their emotions, such as anger or personal choices. This external orientation, likely learned in childhood, may continue into adulthood, making them more susceptible to STS when working with traumatized clients.

Lastly, the Unrelenting Standards Schema Domain's relationship with STS was mediated by self-compassion. People who have high scores in this schema domain strive to meet internalized, often unattainable, standards to avoid experiencing disapproval or feeling shame. They seek external validation rather than developing a secure sense of self (27). These professionals may be more prone to experience STS and lack self-compassion due to the unrealistic standards they impose on themselves.

When reviewing these results, it is evident that individuals with high scores in schema domains experience more severe STS. As Young et al. (27) emphasized, early maladaptive schemas develop in childhood and evolve throughout life. It can be inferred that continued exposure to others' traumatic experiences for occupational reasons may contribute to the reinforcement of these schema domains.

Self-compassion mediated the relationship between all schema domains except for the Impaired Limits Schema Domain and STS. In schema therapy, focusing on childhood experiences is crucial, as low levels of self-compassion and the development of EMS are related to toxic childhood experiences (29, 30, 54). Exercises aimed at developing self-compassion are employed to foster a healthy adult mode in schema therapy (55). In short, self-compassion plays a crucial role in EMS.

It is hard to find a study that examined a similar model to the current study in literature. However, there was research that partially supported our findings. Yakın (34) examined the mediating role of self-compassion with emotion regulation in the relationship between EMS domains and psychological well-being. According to this study, the relationship between Disconnection/ Rejection, Impaired Autonomy and Performance, and Other-directedness Schema Domains and psychopathological symptoms were mediated by emotion regulation and self-compassion. When considering that STS is related to psychological well-being, it may be thought that the current findings are supported by this study (34). Another study discovered that the positive dimension of self-compassion had a mediation role in the relationship between childhood traumas and the Disconnection/rejection Schema Domain in individuals who had substance addiction (35). Thimm (33) found that the relationship between EMS and psychological distress was mediated by self-compassion and mindfulness.

Although the results mainly were significant, there were some limitations such that further research needs to be considered. One of the limitations of this study is the small sample size. During the data-collecting process, it was observed that some refugee aid organizations are closed to scientific research from outside their institutions. Thus, it is assumed that there may have been difficulties in reaching more participants. Because of the small sample size, this study may not reflect the population, which might create a problem with generalizability. Second, it should be noted that the validity issues arising from the use of self-report scales in the study may limit generalizability of the findings. Several participants also reported that the length of the questionnaires in the current study was too long. Therefore, it may be suggested to use shorter scales or different measurement tools in future studies. Third, some features of the questionnaire were not convenient for professionals who work with refugees. For instance, some translators could not participate in the current study because of the language barrier. In other words, although they knew how to speak Turkish, they did not know how to read in Turkish, so they could not answer the items.

In conclusion, the findings of this study indicate that receiving in-service training is highly effective in preventing secondary traumatic stress (STS) among refugee aid workers. The levels of self-compassion, which are related to high scores in early maladaptive schema (EMS) domains, influence the STS levels in these workers. Self-compassion was found to mediate the relationship between all EMS domains, except for the Impaired Limits Schema Domain, and STS. Refugee aid workers who scored high in the Disconnection and Rejection, Impaired Autonomy and Performance, Other-Directedness, and Unrelenting Standards schema domains experienced lower STS levels when they had higher self-compassion.

These findings emphasize the importance of addressing emotional vulnerabilities in refugee aid workers and implementing targeted interventions that enhance their well-being and resilience. In par-

ticular, the development of programs based on schema therapy and self- compassion practices could help reduce the prevalence of STS in refugee aid workers. Future research should continue exploring the role of self-compassion and EMS domains in other high- risk occupational groups, focusing on larger sample sizes to increase the generalizability of the findings.

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How does anxiety disorder diagnosis affect emotion recognition, empathy and social responsiveness in adolescence?

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SUMMARY

Objective: We aimed to evaluate the association between the existence of an anxiety disorder (AD) diagnosis in adolescents and social cognition skills such as emotion recognition, empathy and social responsiveness and to compare the results with healthy control group (CG). The second aim of study was to compare the factors affecting social cognition skills in adolescents with ADs with CG.

Method: Psychiatric assessments and diagnoses were evaluated by clinical interview based on DSM-5 and Kiddie-schedule for affective disorders and schizophrenia-present and lifetime version-Turkish Adaptation (K-SADS-PL-T). Wechsler Intelligence Scale for Children-Revised (WISC-R) and Diagnostic Analysis of Nonverbal Accuracy (DANVA) was applied to the participants. Sociodemographic form, Social Responsiveness Scale (SRS), Griffith Empathy Measure (GEM), Strengths and Diffuculties Questionnaire (SDQ), KA-SI Empathic Tendency Scale (KA-SI ETS) were used.

Results: 87 admissions in total were examined for our study. 58 (66.6 %) of the admissions were cases with AD and 29 (33.3%) were the control group. AD group consisted of 34 female adolescents (58.6 %), whereas control group consisted of 17 female adolescents (58.6 %). The average age was 14.06±2.12 (years) and 13.51±2.23 (years), respectively. The adolescents with AD had significantly higher social responsiveness problem scores than the CG after adjusting hyperactivity levels but no difference was found between the two groups in terms of empathy level and emotion recognition.

Discussion: There has been a impairment in social responsiveness in the presence of the AD. It was found that this impairment occurs when anxiety disorder is accompanied by both hyperactivity and low cognitive empathy.

Key Words: Anxiety disorders, face emotion recognition, empathy, social cognition, adolescent.

INTRODUCTION

Anxiety disorders (ADs) are one of the most common problems in child and adolescent psychiatry, and approximately 10% of young people meet the criteria for AD (1). Lack of information processing can increase anxiety by impairing the ability to read interpersonal threat and security signals (2). Emotion recognition, empathy skills and social reciprocity; they are the basic components of human being, who is a social being, in establishing and maintaining social interaction. They are all essential skills for the delivery of social cognition. Although emotion recognition is a social skill that develops earlier in typically developing children, our ability to distinguish between basic facial expressions of emotion shows a slow progression between infancy and early adulthood (3,4). Understanding emotion recognition abilities can be effective in understanding adolescent development and potential mental health issues during this period (4). The inadequacy of these basic early emotion recognition skills has negative consequences for the child's social development and prevents the child from learning about other people's emotions and reactions (3). In literature; it is known that children and adolescents with AD have deficiencies

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in facial emotion recognition skills (2). The amygdala, prefrontal, anterior cingulate, and inferior temporal cortex may play role in deficient face recognition (2).The acquisition of fear-related conections has been associated with the amygdala, the regulation and destruction of these connections depends on the medial prefrontal cortex (5). Among the temporal connections to the prefrontal cortex (PFC), the amygdala is the most prominent and most consistently implicated in anxiety disorders. (6). It has been predicted that children with AD may have a smaller volume of amygdala than healthy children (2). One study reported a significant association between symptom severity of social anxiety and functional connectivity between the amygdala and medial prefrontal cortex, which are involved in the perception of fearful faces (7,8). Facial emotion recognition rates in bipolar disorder (BD), anxiety disorder and healthy control groups were examined in another study. It was found that the facial emotion recognition rates were significantly lower in the AD and especially in BD groups compared to the control group (9).

Empathy is the ability to comprehend and share the emotional state of another person, to provide an appropriate emotional response to the other person's circumstance, or to experience the world through the other person's perspective (10). Empathy has a multidimensional structure. Affective empathy is characterized by feelings of sympathy or a tendency to worry about those experiencing misfortune (11). Cognitive empathy includes recognizing and understanding the emotional state, taking the perspective of others, and mentalization. Therefore, emotion recognition is a critical component of cognitive empathy (12). In the literature, the relationship between anxiety and empathy is an under-researched topic. Empathy-related processes may play a role in the development of anxiety symptoms and related social difficulties. Anxiety and affective empathy were found to be positively related (13). High levels of affective empathy can exacerbate anxiety, particularly in social anxiety disorder (SAD). A lack of cognitive empathy can lead to difficulties in social functioning, failed social relationships, and an increased risk of developing social anxiety (14).

Social reciprocity is one of the important components in providing social interaction. Mutual social behaviors, social use of language, and pathognomonic autistic symptoms are discussed within the context of social interaction. (15). The clinical condition characterized by impaired social reciprocity is autism spectrum disorder (ASD) (16). As a result, earlier research focused on autistic traits in the presence of anxiety condition to investigate the relationship between AD and social reciprocity. SRS is a popular ASD symptom measure. High autistic trait scores in children with AD (17) and phenotypic similarity with ASD (18) have heightened interest in research in this area. In a study conducted in children selected from the normal population with longitudinal design, the bi-directional relationship between autistic and internalizing traits was examined. In the first relationship, autistic traits at the age of 7 contributed to the internalizing traits at the age of 12, and in the second relationship, an asymmetric relationship was found that the internalizing traits at the early age contributed to the autistic features in the late period. The first relationship is greater than the second (19). These results suggest whether autistic traits such as social reciprocity are a possible precursor of AD in later life.

The hypothesis of our study is that emotion recognition, empathy and social reciprocity will be negatively affected in the presence of anxiety disorder. Therefore in this study, we aimed to evaluate the association between the existence of an anxiety disorder diagnosis in adolescents and social cognition skills such as emotion recognition, empathy and social responsiveness and to compare the results with healthy controls.

METHOD

Design and Participants

The study was planned as a cross-sectional clinical study. The study's ethics committee application was approved by the Marmara University Faculty of Medicine Research Ethics Committee on 03.02.2017 under protocol number 09.2017.120. In our study, the anxiety disorder group consisted of 58 adolescents aged 11 to 17 years who were diagnosed with anxiety disorder applied to the child and

adolescent psychiatry outpatient clinic. The control group was formed by adolescents who were referred by the pediatric clinic and had no psychiatric complaints or admissions until then. The diagnosis of anxiety disorder and its exclusion in the control group were provided by two clinicians, a 4-year resident and a specialist physician in the child psychiatry department. A clinical psychiatric interview was conducted with the control group by the same clinicians, and anxiety disorder and its subgroups "diagnostic and statistical manual of mental disorders-5 (DSM-5)" criteria were questioned to rule out the diagnosis of anxiety disorder. The control group consisted of 29 healthy, age- and gender-matched adolescents without any psychiatric diagnosis. In addition, adolescents who described subthreshold anxiety symptoms were not included in the control group. Informed consent was obtained from the all participants and their families.

In the AD group; the exclusion criteria of the study consisted of an intelligence level of less than 70 (Wechsler Intelligence Scale for Children-Revised (WISC-R) verbal, performance and/or total score ≤70), a diagnosis of ASD, psychotic or bipolar disorder and neurological disorder, and a history of substance use or head trauma. In the CG; exclusion criteria of the study consisted of an intelligence level below 70, the presence of a clinical psychiatric disorder according to DSM-5, the presence of chronic and serious medical disease, and neurological disorder.

Clinical Evaluation and Psychometric instruments

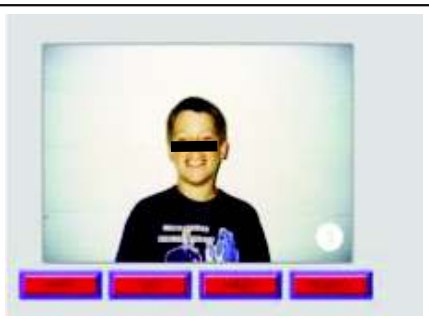
For the general psychiatric evaluation and diagnosis, the participants were administered K-SADS-PL-T. Diagnoses that could not be screened with K-SADS-PL-T were evaluated with the clinician's interview based on DSM-5. WISC-R was applied to evaluate the mental levels of the participants. In the evaluation of adolescents, sociodemographic form, SRS, GEM, SDQ, KA-SI ETS were used. DANVA was applied to the adolescents. The data were first evaluated on two groups, anxiety disorder and control group, and the results were compared between the groups.

Assessments Made by the Clinician:

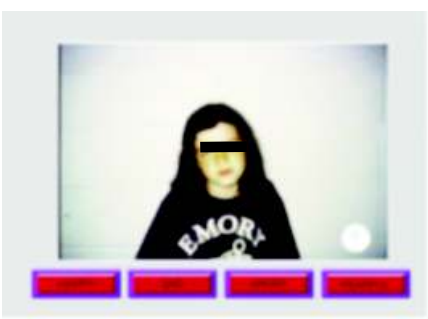
Sociodemographic Form: The sociodemographic characteristics of the adolescents participating in the study were evaluated using a semi-structured sociodemographic information form prepared by the researcher. In the form, information such as the age and gender of the adolescent, the education and socioeconomic level of the family are questioned.

Kiddie-Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version (K-SADS-PL): All the adolescents and their parents who participated in the study were administered K-SADS-PL-T and the psychiatric diagnoses of the adolescents were determined. K-SADS-PL-T was developed by Kauffman et al. to screen for psychopathology in children and adolescents aged 6-18 years, according to DSM-III-R and DSM-IV diagnostic criteria, and is a semi-structured interview form (20). The validity and reliability study in Turkey was conducted by Gökler et al. in 2004 (21).

Diagnostic Analysis of Nonverbal Accuracy (DANVA-2): DANVA is a standardized screening test for the assessment of nonverbal social processing abilities (22). In this study, the Child Facial Expressions (DANVA-CFE) subtest of the test was used. The participant was asked to describe the emotion in each picture. In these subtests, four basic emotions were presented as 'happy, sad, angry and fearful'. In addition, the faces are divided into two different categories as low and high intensity



Figures 1-2



according to the intensity of the emotion expression they contain. Twenty-four children's facial expressions were defined by the children on the computer. In the CFE subtest, each of the four basic emotions was presented six times. Answers can be scored as the sum of correct or incorrect answers. In this study, scores were determined by summing up the number of incorrect answers (Figures 1&2).

Wechsler Intelligence Scale for Children-Revised (WISC-R): WISC, in order to evaluate the mental capacities of children with sufficient speech and language skills, the scale was revised in 1974 and renamed WISC-R, and the age range is 6-16 (23). Validity and reliability studies in our country were carried out by Savaşır and Şahin (24). WISC-R subtests were applied to evaluate the mental capacities of the anxiety and control groups.

Scales filled in by Adolescents

Strength and Difficulties Questionniare (SDQ)-Adolescent Form: Developed by British psychiatrist Robert Goodman in 1997 (25), the SDQ has twenty-five questions questioning positive and negative behavioral characteristics. The questions are grouped under five subtitles; Attention Deficit and Hyperactivity, Behavioral Problems, Emotional Problems, Peer Problems and Social Behaviors. This questionnaire has parent and teacher forms for ages 4-16 and forms filled by the adolescent himself/herself for ages 11-16. Turkish validity and reliability was done by Güvenir et al. (2008) (26).

Child and Adolescent KA-SI Empathic Tendency Scale (KA-SI ETS): It is a measurement tool developed to measure the empathic tendencies of children and adolescents (27). The adolescent form consists of 17 items in total. 10 of them measure affective empathy and 7 of them measure cognitive empathy. As the scores obtained from the scale increase, the empathic tendency increases, and as the scores decrease, the empathic tendency decreases. The Turkish validity and reliability of this scale in children and adolescents was made by Kaya and Siyez (27).

Scales filled in by Parents

Social Responsiveness Scale (SRS): There are 65 items in total in the scale. The items are related to reciprocal social behaviors, social use of language, and pathognomonic autistic behaviors. As the score on the scale increases, the severity of social impairment also increases (15). The Turkish validity and reliability of the scale were evaluated by Ünal et al. (2009) (28).

Griffith Empathy Measure (GEM): The Griffith empathy scale is a comprehensive scale used to measure affective empathy in children. It has three different forms: parental reporting, self-report, and observation of children's affective responses with video recordings. The parental reporting scale was adapted from the Bryant Empathy Scale for Children (29). The validity and reliability of this scale in a Turkish sample was conducted in a thesis study (30).

Statistical Analysis

The data were evaluated using the Statistical Package for the Social Sciences (version 21) program. Descriptive statistics are shown as mean–standard deviation. A 95% confidence interval was used to assess the data. In order to examine whether all continuous variables included in the study were normally distributed, the Kolmogorov Smirnov test was applied and $p>0.05$ was obtained, and it was determined that the variables were normally distributed. Therefore, comparisons were made between the two groups with the T test. The T test was used for comparing SDQ total and subscores in two groups. Pearson correlation analysis was applied for examining correlations of emotional, behavioral symptoms and gender with empathy, facial expression recognition and social reciprocity scores. Hyperactivity levels were measured with the hyperactivity subscale of the SDQ. Gender and hyperactivity level were controlled by using one way analysis of covariance (ANCOVA) in the comparison of empathy, facial expression recognition and social reciprocity scores beween groups. Hierarchical regression analysis was used to define the effects of anxiety disorder status, hyperactivity and cognitive empathy levels on social reciprocity. The alpha expressiveness value was regarded as

Table 1. Comparison of total and subscale scores of strength and difficulties questionnaire between groups

	Anxiety Disorders		Control		
	Mean	SD	Mean	SD	P
Emotional Symptoms	5.30	2.43	3.00	2.46	<0.001**
Conduct Problems	2.09	1.73	1.97	1.30	0.73
Hyperactivity Symptoms	4.58	2.31	4.03	2.11	0.29
Peer problems	2.96	1.74	2.48	1.30	0.19
Total Difficulties	23.18	5.31	19.69	4.96	0.004*
Prosocial Behaviour	8.25	1.64	8.21	2.24	0.92

*p<0.01 **p<0.001

<0.05.

RESULTS

87 admissions in total were examined for our study. 58 (66.6 %) of the 87 admissions were cases with AD, while 29 (33.3 %) were were control group with no psychiatric disorder. There was no missing data. AD group consisted of 34 female adolescents (58.6 %), whereas CG consisted of 17 female adolescents (58.6 %). The average age was 14.06±2.12 (years) and 13.51±2.23 (years), respectively. There was no significant statistical difference between the groups in terms of age (p = 0.265) and gender (p = 1.00). Socioeconomic status was calculated on the basis of parents' education and income levels using the dummy variable (31). When comparing the socioeconomic status between the two groups there was no significant difference (p=0.175), and the mean values were 7.96±2.56 for anxiety disorder group and 7.20±2.14 for control.

There were some psychiatric comorbid diagnoses in adolescents with AD. Attention deficit hyperactivity disorder (ADHD) was the most common comorbid diagnosis with a rate of 34.5 % (n=20). Twenty six percent of anxiety disorder group (n=15) had obsessive compulsive disorder, 24.1 % (n=14) had depression, 6.9 % (n=4) enuresis, 5.2 % (n=3) tic disorder, 3.4 % (n=2) oppositional defiant disorder (ODD), and 1.7 % (n=1) conduct disorder (CD).

We compared the two groups in terms of behavioral and emotional symptoms levels by using SDQ. Emotional symptoms (5,30±2.43; p<.001) and total difficulties (3,00±2.46; p=.004) scores were significantly higher in anxiety disorder group. There were no significant differences in hyperactivity, conduct, peer problems levels and prosocial behavior scores between the two groups (Table 1).

Gender was significantly correlated with emotional symptoms (r=.352; p<.01), parent rated empathy (r=.285; p<.01) and self reported affective empathy (r=.361; p<.01) levels. Emotional (r=.282; p<.01), hyperactivity (r=.349; p<.01) and peer problems (r=.340; p<.01) were positively correlated with social responsiveness problems. Hyperactivity (r=-.335; p<.01), peer (r=-.367; p<.01) and social responsiveness (r=-.374; p<.01) problems were negatively correlated with cognitive empathy. There was significant positive relationship between social responsiveness problems (r=.306; p<.01) and facial expression recognition errors. The correlations of gender, behavioral and emotional symptoms levels, empathy scores, facial expression recognition errors and social responsiveness problem levels are shown in Table 2. As in the study of Ayaz et al., SRS total score was used (32).

Table 2. Correlations of emotional, behavioral symptom scores and empathy levels, facial expression recognition errors and social responsiveness problems

	Emotional	Conduct	HA	Peer	GEM-PR	Affective empathy	Cognitive empathy	DANVA total	SRS
Emotional	1								
Conduct	0.322**	1							
HA	0.305**	0.359**	1						
Peer	0.276*	0.132	0.210	1					
GEM-PR	0.199	-0.192	0.039	0.016	1				
Affective empathy	0.117	-0.127	-0.099	-0.136	0.509**	1			
Cognitive empathy	-0.157	-0.111	-0.335**	-0.367**	0.192	0.602**	1		
DANVA total	0.098	0.044	-0.054	0.139	-0.087	-0.090	-0.115	1	
SRS	0.282**	0.226	0.349**	0.340**	-0.157	-0.184	-0.374**	0.306**	1
Gender	0.352**	-0.050	0.030	0.031	0.285**	0.361**	0.135	-0.087	-0.1

*p<0.05 **p<0.01 ***p<0.001

Note: GEM-PR: Griffith Empathy Measurement- Parent Report; HA: Hyperactivity; DANVA: Diagnostic Analysis of Nonverbal Accuracy; SRS: Social Responsiveness Scale

Coding method of categorical variables in statistical analysis 1:male 2:female

Correlation coefficient values (r) are given in the table. The superscripts in the r value indicate the range in which the p value.

Table 3. Comparison of empathy, facial expression recognition and social responsiveness between groups

	Anxiety Disorders		Control			
	Mean	SD	Mean	SD	F	P
GEM-PR[a]	45,81	10.34	44,97	10.35	0.11	0.73
Cognitive empathy[b]	14,14	4.29	15,79	4.20	2.01	0.16
Affective empathy[a]	19,42	6.28	20,76	7.99	0.88	0.34
DANVA Total	4,88	2.40	4,34	2.32	0.98	0.32
SRS[b]	62,19	23.69	49,76	18.23	4.93	0.029*

*p<0.05

Note: GEM-PR: Griffith Empathy Measurement- Parent Report; DANVA: Diagnostic Analysis of Nonverbal Accuracy; SRS: Social Responsiveness Scale

[a]Adjusted for gender [b]Adjusted for hyperactivity

After controlling for hyperactivity levels, adolescents with anxiety disorders had significantly higher social responsiveness problem scores (62,19±23.69) compared to the control group (49,76±18.23) (p<.05). There were no significant differences between groups in terms of empathy levels and facial expression recognition errors after adjusting for gender and hyperactivity (Table 3).

According to hierarchical regression analysis, hyperactivity symptoms had a positive relationship (B=.24; p<.05) and cognitive empathy had a negative relationship (B=-.25; p<.05) social responsiveness problems. The significant relationship between anxiety disorders status and social responsiveness did not continue when hyperactivity and cognitive empathy added to the regression analysis in step 2 (Table 4).

DISCUSSION

In this study, we first examined the emotional expression recognition, empathy and social responsiveness skills of adolescents aged 11-18 years with a diagnosis of AD. We aimed to compare these parameters with age- and sex-matched healthy adolescents without a diagnosis of AD. We found that there was an impairment in social responsiveness in the AD group compared to CG, but there was no impairment between the two groups in terms of empathy level and emotion recognition Second, we aimed to examine the factors affecting social cognition skills in adolescents with ADs compared to healthy controls. We also looked the relationship of these skills with the symptom levels of emotional and behavioral problems such as hyperactivity and peer problems, and took into account the effect of variables that had a significant relationship between them. We showed that the impairment in social responsiveness in the AD group was accompanied by hyperactivity and low cognitive empathy. The findings are discussed in the light of the relevant literature.

Table 4. Predictors of SRS total

Variable	B	SE (B)	B
Step 1			
Anxiety Disorder Status	12.43	5.02	0.61*
Step 2			
Anxiety Disorder Status	8.85	4.70	0.18
Hyperactivity	2.42	1.03	0.24*
Cognitive Empathy	-1.26	0.54	-0.25*

Predicting Total SRS: ΔR^2=0.068 for Step 1; ΔR^2=0.230 for Step 2.
1:anxiety 0: kontrol *p<0.05

The fact that there was no significant difference between the two groups in the sociodemographic evaluation, which looked at the gender, age, and socioeconomic status of the families, is relevant in terms of group comparison. In both groups, the number of girls is higher than that of boys. In the literature, anxiety in children and adolescents is more prevalent in girls than in boys (33).

Behavioral and emotional problems between the anxiety and control groups were compared with the SDQ. Emotional problems and total difficulty score were found to be significantly higher in the anxiety group. A high score for emotional problems is important in terms of supporting the diagnosis of anxiety disorder in the AD group.

According to the correlation analysis, parent-reported affective empathy and self-reported affective empathy scores were significantly higher in girls than in boys. When we approach the concept of empathy theoretically, social expectations greatly influence gender behavior and roles. This shows that women are arranged to express more empathy than men. This difference between the gender is based on the traditional role of women in child care, parenting instinct, and the development of emotional perceptual skills by mothers to understand their children's feelings and needs in order for their children to survive (34). Research in

infants and young children and animal studies provide evidence that gender differences in empathy also have phylogenetic and ontogenetic roots. Affective empathy motivates prosocial behaviors; This supports the idea that women tend to be more prosocial and altruistic. Evidence from a variety of psychological and behavioral studies supports the idea that key neural networks involved in affective empathy are more developed in women (35). A study examined the relationship between social cognition and gender-specific neural mechanisms, revealing that during tasks performed in an fMRI, women showed greater neural activity in the right inferior frontal cortex and superior temporal sulcus, whereas men exhibited increased activity in the left temporoparietal junction. In face-to-face empathetic interactions, it was found that women utilized mirror neuron-related areas more than men, and that women and men activated different neural mechanisms (36).

A significant negative correlation was found between hyperactivity symptom levels, peer problems and social reciprocity problem levels with cognitive empathy skills in analyse. In our study, ADHD was the most common comorbid condition after the AD diagnosis group. ADHD, which is characterized by symptoms of hyperactivity/impulsivity and/or inattention, includes deficits in cognitive and/or affective empathy as well as impairment in social behavior (37). In a study evaluating both the affective and cognitive components of empathy, it was defined that empathic impairment was higher in the ADHD-combined subtype compared to the ADHD-inattention dominant subtype (38). Inattention and hyperactivity/impulsivity, which are the main features of ADHD, can impair peer interaction due to their nature. Therefore, children with ADHD frequently experience peer problems and rejection (39). There is a positive relationship between hyperactivity and peer problems (40). Considering the mechanisms underlying these social behavior difficulties in hyperactive children, it has been shown that empathy is negatively affected and social perspective-taking levels may be low in children with ADHD (41,42). In a study conducted in adolescents examining empathy and peer bullying, cognitive empathy was found to be associated with physical and relational violence. Cognitive empathy was found to be independent of gender in relational violence; on the other hand, there was a negative correlation in physical violence only in males (43).

The disruption of the interaction between affective empathy and cognitive empathy and the deficit in either of them lead to social impairment (44). Individuals with CD and ASD experience social problems and, as a result, peer problems due to disruptions in empathic processing (45). Potentially overlapping empathy deficits in adolescents with ASD and CD are associated with social behavioral problems in ASD and CD. The ACC/MCC (anterior/middle cingulate cortex) and vmPFC (ventromedial PFC) are part of the default mode network, which has been associated with social cognition and cognitive empathy, which are also disrupted in ASD (46, 47). Structural abnormalities in the vmPFC and ACC/MCC and their relationship to CD features may contribute significantly to ASD symptoms, impair social cognition, and potentially worsen empathy deficits (45).

In our study, after the effects of gender and hyperactivity were controlled, the difference in empathy levels between the AD and CG disappeared. Many studies have shown that internalizing symptoms are positively associated with affective empathy (13). In a study examining the relationship between empathy and anxiety dimensions, affective empathy was positively associated with all anxiety dimensions, with the strongest separation/panic and humiliation/rejection anxiety. Cognitive empathy is negatively related to social and separation/panic anxiety. These results suggested that empathy-related processes may play a role in the development or maintenance of anxiety symptoms. (14). In a study evaluating the level of empathy in individuals with SAD, no clear relationship was found between SAD and empathy levels (48). In another study conducted in individuals with SAD, only a difference in affective empathy was found compared to healthy controls, and it was shown that individuals with SAD were less able to share the positive emotions of others (49). A recent meta-analysis found a significant but weak relationship between anxiety and cognitive empathy. The same meta-analysis also found that the relationships between anxiety and empathy did not differ across types of anxiety (50). It is known that there are

empathy problems in ODD and CD (51). Boys with ODD/CD were impaired in empathy-related responses to negative emotions when accompanied by high levels of anxiety (52). When poor executive attention skills accompany anxiety especially in boys with ODD/CD; found to be associated with less empathy (53).

One of our findings is that social reciprocity problems and the deficiency in facial emotion recognition are positively related to each other. There was no significant difference between the AD group and the CG in terms of emotion recognition. A recent meta-analysis examined social cognitive skills such as emotion recognition and theory of mind in SAD and GAD; impairments in emotion recognition and theory of mind were seen in SAD, but results were equivocal in GAD (8). In the literature, it has been observed that the relationship between social reciprocity and emotion recognition is mostly examined in ASD (54, 55). There are also deficits in emotion recognition in ASD, where social reciprocity is not sufficient (3). In a study conducted with children with low and high functioning autism with a computer-based program, these children were made to practice facial expressions and emotion recognition and eye contact; after these practices, it was noted that there was an improvement in emotion recognition and therefore social skills in both groups (56).

The presence of emotional problems, hence the diagnosis of AD, hyperactivity and peer problems, and impaired social responsiveness were found to be positively related. In studies, SRS is frequently preferred to look at autistic traits in ADHD. As a result of these studies, it is seen that social reciprocity problems are common in ADHD. Social reciprocity problem scores were found to be higher in cases with ADHD-combined type including hyperactivity (57, 58). In studies conducted in our country, it was found that deterioration in social reciprocity was higher in the ADHD group compared to healthy individuals (32, 59). As discussed earlier, impairment in empathy and/or social reciprocity also affects social skills in the ADHD group. And these children may experience peer problems more frequently (40). The impairment in social functioning, which is mostly manifested by peer problems in ADHD, is more severe when ADHD is chronic and/or in the presence of ODD/DD that frequently accompanies ADHD (60). In the evaluation made using SRS in children born preterm, it has been reported that behavioral and emotional problems are high in children with high SRS scores (61). It has been shown that children with less behavioral problems in preschool and school age children have better social skills. In the same study, it was found that girls had better social skills, while boys had more behavioral problems (62).

It was determined that deterioration in social responsiveness continued in the AD group after the effect of hyperactivity level was controlled. In the related literature, it has been seen that social reciprocity is frequently discussed in social anxiety and less frequently in selective mutism from the AD group, similar to the concept of empathy. ASD, social anxiety and selective mutism show phenotypic similarity with impaired social interaction aspect. SRS was used in one study to distinguish between these disorders. And overlapping of SRS scores of the three disorders is shown (63). Preoccupations, avoidance of social situations, repetitive behaviors such as obsessions and compulsions, and speech problems such as dysfluency seen in ADs are also common in children with ASD (18). The "Program for the Education and Enrichment of Relational Skills (PEERS®)" intervention, which is directed at social anxiety symptoms closely related to social skills in individuals with autism, provided significant improvements in social anxiety symptoms and social reciprocity (64). It has been shown that autistic traits during early development and current ASD symptoms are more common in children with AD than typically developing children. The relationship with autistic traits has been shown especially in social phobia (65). In a study examining comorbidity in children with SM, it was reported that 68.5% of children with SM met the criteria for developmental delay and 7.4% met the criteria for Asperger's syndrome (66). In these studies with similar findings to our study, it was observed that the sample size was not very large (18,63,65-66).

One study examined ASD symptoms in children diagnosed with anxiety and/or mood disorders. And more than half of the cases scored above the standard cut-off values on the screening scales

used, including SRS (67). In another study, which was a continuation of the previous research, the relationship between anxiety disorders and ASD symptom scale scores was examined. Adolescents with anxiety or mood disorders were found to exhibit higher SRS scores compared to healthy adolescents. However, no relationship was found between ASD symptom scale scores and subtypes of AD. It had been emphasized that it may be beneficial to include determining social reciprocity problems among the treatment goals in pediatric anxiety disorders and mood disorders (68). In these studies, the subgroup scores of SRS were not examined separately, comments were made on the total score.

In our study, in line with the literature, it was found that social responsiveness problems increased in the presence of the AD. When we examine this situation in detail, in fact, the deterioration in social responsiveness is not due to the presence of the AD alone. Impairment in social responsiveness has been found to occur when AD is accompanied by both hyperactivity and low cognitive empathy. The variables associated with hyperactivity and cognitive empathy levels are discussed in detail.

One of the important limitations of our study is the small sample size. When the sample is divided into groups, the number of cases in the groups and the degree of comparison of the groups with each other decrease. Some of the non-significant findings may be due to the small sample size. The WISC-R used to measure mental capacity in the study is an old intelligence test, and the DANVA used for emotion recognition has not been validated and reliable in the Turkish sample.

Another limitation is the presence of comorbid psychiatric diagnoses in the AD group and the heterogeneity of the group in terms of AD diagnosis. In the presence of a comorbid psychiatric condition, the underlying psychopathology may be on a broader basis only when the mechanisms that will cause the emergence of AD are considered. Considering the multidimensional structure of the AD; it should be noted that etiological factors and symptoms are both similar and divergent. This situation may require separate specific preventive and therapeutic interventions for different ADs.

The issue of AD and empathy is an underresearched topic in the literature. It was observed that empathy studies were mostly performed in the SAD group. The fact that our study deals with this subject is valuable in terms of contributing to the knowledge of the literature. Understanding the relationship between anxiety and emotion recognition, empathy and social responsiveness and the factors affecting this relationship; It will allow a more detailed interpretation of the clinical picture. Improvement of deficits in social cognition will also be taken into account when planning AD treatment. Evidence-based social and relational skills interventions that prioritize peer relationships, CBT, and new computer-based programs, especially in social anxiety, have been added to traditional treatments for anxiety disorders, yielding positive results. Social cognition concepts and anxiety subdimensions can be handled separately in new studies to be conducted in this area. New studies need to be planned to show how social cognition concepts change when anxiety is accompanied by psychiatric conditions such as hyperactivity. Future research in this direction will allow us to obtain new information about the functioning of social-cognitive concepts in the presence of internalizing disorders such as AD.

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The relationship between depersonalization/ derealization symptoms and metacognitions in patients with panic disorder

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SUMMARY

Objective: The objective of this study was to examine whether the presence of Depersonalization/Derealization symptoms in individuals with panic disorder is associated with metacognitive differences, the frequency with which these individuals experience dissociative symptoms outside of attacks, and the relationship between metacognitions and the severity of panic disorder symptoms.

Method: The SCID-5 was utilized to assess the patient cohort, with the patient group diagnosed with panic disorder by the DSM-V diagnostic criteria. Patients exhibiting comorbid psychiatric disorders were excluded. Subsequently, the Panic Disorder Severity Scale was administered to the patient group, while the Metacognitions Scale-30 and the Dissociative Experiences Scale were administered to both the patient and control groups. The Panic Disorder Severity Scale, the Metacognition Questionnaire-30, and the Dissociative Experiences Scale were employed to assess the severity of panic disorder, evaluate metacognitive functions, and screen for dissociative symptoms.

Results: The study included 58 panic disorder patients and 61 healthy volunteers. In patients with panic disorder, more elevated scores were got in the Metacognition Questionnaire-30, particularly in the subscales measuring the need to control thoughts and the perception of uncontrollability and danger. Patients demonstrated statistically significant more elevated scores on all scales of the Dissociative Experiences Scale. A statistically significant difference was observed in the DES subscales of depersonalization/derealization and absorption between the patient group with and without depersonalization/derealization manifestation.

Discussion: Although patients with panic disorder exhibited metacognitive contrasts, no statistically significant difference was found between those with and without Depersonalization/Derealization. This suggests that the Cognitive Attentional Syndrome may be responsible for the onset of panic attacks. These patients tend to exhibit more severe symptoms. The use of metacognitive therapy may prove beneficial for patients exhibiting these symptoms who demonstrate a somewhat diminished response to conventional cognitive behavioral therapy.

Key Words: Metacognition, Panic Disorder, Depersonalization, Cognitive Attentional Syndrome.

INTRODUCTION

Metacognition is defined as the process of considering one's thinking, encompassing the awareness of one's knowledge and limitations, as well as the capacity to regulate one's thoughts. It delineates the psychological structures, occasions, information and procedures implicated in the regulation, change and understanding of thinking (1). The concept of metacognition was first proposed by Flavell in 1979. By Flavell's conceptualization, metacognition is defined as the understanding of one's cognitive processes and the utilization of this knowledge to regulate cognitive processes (2). In other words, it examines one's cognitive processes (3). In the early 1990s, when the limitations of cognitive behavioral procedures used in the explanation and therapy of mental disorders were highlighted, the concept of metacognition emerged as a potential solution. It was postulated that any dysfunction in metacognitions played a role in the etiology and progression of psychopathology. Consequently, individuals hold both positive and negative beliefs about their thoughts, which in turn affects their evaluation of experiences (4,5). In other words, dysfunctional metacognitions result in the development of maladaptive behaviors.

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To date, theoretical research has concentrated more on the respiratory and cognitive characteristics of panic disorder. A common feature of cognitive models is the catastrophic misapprehension of physical sensations. For instance, palpitations may be misconstrued as a sign of a heart attack, while a slight shortness of breath may lead to respiratory arrest and death (6). Despite the subclassification of Panic Disorder (PD) as cardiorespiratory, gastrointestinal, non-respiratory, or cognitive, Depersonalization/Derealization (DD) symptoms appear to warrant a distinct classification in terms of treatment (7,8,9). A study, diagnosed with panic disorder, reported that 34.7% of the participants exhibited dissociative disorder symptoms during episodes of panic.

Furthermore, it was observed that these patients were more youthful, had an earlier commencement of the disorder, and suffered more from other psychiatric disorders (10). A study accomplished on patients diagnosed with panic disorder revealed that 24.1% of the patients exhibited symptoms of depersonalisation/derealisation during an attack. Furthermore, the patients were experience a greater number of attacks, and demonstrate lower functionality. It was also emphasised that these patients may have a more fierce subtype of panic disorder (11).

The metacognitive theory is concerned with how individuals think and assume that the issue lies in rigid and repetitive thinking manners in reaction to negative thoughts, sensations and beliefs (12). Wells designated this mode of cognition as Cognitive Attentional Syndrome (CAS), characterized by repetitious thought patterns, such as rumination or worry, and other maladaptive coping behaviors, including thought suppression (13). CAS develops as a consequence of metacognitive beliefs and an understanding of the efficacy of repetitive thought patterns and maladaptive coping behaviours. An individual may hold positive beliefs regarding the efficacy of repetitive thought patterns in mitigating perceived threats. One illustrative example is the belief that worrying about the future serves to avoid danger. Wells posits that coping mechanisms related to CAS are the primary factor in pathologies, rather than the underlying maladaptive beliefs (12).

CAS is characterised by a pervasive and persistent form of thinking, commonly referred to as rumination or worrying. This process involves focused attention on the perceived threat and the utilisation of maladaptive coping mechanisms, such as thought suppression, avoidance, explicit and implicit neutralization, and rituals. In panic disorder, it is the worry about future attacks that ensures the persistence of anxiety. The act of scanning bodily sensations creates an environment conducive to the development of the illness, as it increases the likelihood of subsequent attacks being triggered. Consequently, those with a proclivity for such cognitive and attention-focused response patterns are at risk of perpetuating anxious arousal and experiencing recurrent panic attacks. Such patterns also contribute to the formation of beliefs that anxiety is uncontrollable and has harmful consequences (12).

In light of the aforementioned information, it is necessary to ascertain whether patients presenting with depersonalization/derealization symptoms in the context of panic disorder could be considered a distinct subgroup in terms of metacognitions. It is also important to determine whether different treatment approaches can be employed in the treatment of these patients compared to others. Furthermore, it is essential to investigate whether these patients exhibit DD symptoms outside of the context of panic disorder. Finally, it is crucial to scrutinize whether there is a noteworthy contrast in terms of metacognitions and DD scores when healthy individuals and panic disorder patients are compared. A review of the literature reveals that no study has examined the association between DD and metacognitions in patients with panic disorder. The inclusion of metacognitions in studies across different psychopathological fields may result in discrepancies in diagnosis and treatment approaches. This could pave the way for new developments in the field.

METHOD

Selection of Sample Groups

The study cohort comprised patients diagnosed with panic disorder by the clinician version of the Structured Clinical Interview for DSM-5 disorders

(SCID-5). The psychological assessment was conducted on volunteers between 18 and 65 who had applied to the Bağcılar Training and Research Hospital Psychiatry Outpatient Clinic and consented to partake in the study. The control group corresponded for age and gender and did not present with any psychiatric disorders.

A comprehensive anamnesis was conducted on the study participants, and the SCID-5 and a semi-structured Sociodemographic and Clinical Data Form were employed at the outset of the treatment. The SCID-5 is a structured interview devised to assess the presence and severity of mental disorders, while the Sociodemographic and Clinical Data Form gathers sociodemographic information and clinical data. Patients with other psychiatric disorders were excluded by applying the SCID-5, and solely patients with a diagnosis of panic disorder were contained in the study. The presence of symptoms consistent with DD was identified through the administration of the SCID-5. The Panic Disorder Severity Scale (PDSS) was applied to assess the severity of panic disorder in panic disorder patients. The Metacognition Questionnaire-30 (MCQ-30) was given to the patient and healthy groups to evaluate their metacognitive functions. Similarly, the Dissociative Experiences Scale (DES) was administered to the patient and the healthy control group to screen for dissociative symptoms. All patients included in the study were informed orally and in writing about the intention and method of the study, and their written informed consent was received. All interviews pertinent to the study were conducted by the same interviewer.

Data Collectıon Tools

Sociodemographic Data Form: All participants in the study were required to conduct a data form prepared by the researchers, which was designed to collect sociodemographic and clinical information. This included data on age, gender, educational status, psychiatric disorder, psychiatric drug use, and smoking.

Structured Clinical Interview for DSM-5 Disorders (SCID-5): The utilisation of the structured clinical interview facilitates the achievement of standardisation, which serves several purposes. These include the enhancement of diagnostic validity and reliabi-lity, the prevention of missed diagnoses, the creation of a common language in studies, and the provision of epidemiological data through the utilisation of diagnostic criteria. The Turkish validity and reliability of the SCID-5 was evaluated by Elbir et al. (14).

Panic Disorder Severity Scale (PDSS): The seven-item, semi-structured, physician-scored PDSS, which has been documented to retain adequate psychometric properties, provides a grading of panic frequency, anticipatory anxiety, getaway of physical feelings, agoraphobia, and impairment in work and social functioning (15). To ensure the consistency of measurement, scoring is conducted for the preceding month. The Turkish validity and reliability of the scale have been established (16).

Metacognition Questionnaire-30 (MCQ-30): The scale was devised by Catwright-Hatton and Wells and thereafter, a 30-question brief form of the same scale was created by the same authors (4). A higher score on the scale indicates an increase in pathological and dysfunctional metacognitive activity. The Turkish version comprises five subscales that are conceptually distinct but related to one another. A Turkish validity and reliability study was evaluated by Tosun and Irak (3).

Dissociative Experiences Scale (DES): The scale allows for the evaluation of different manifestations of dissociation, including amnesia, depersonalization, distractibility and absorption. It is not a diagnostic scale, but it is useful in detecting chronic dissociative experiences. The Turkish validity and reliability of the scale was evaluated by Şar et al. (17).

Statistical Analysis

Continuous variables were expressed as mean ± standard deviation and/or median (min-max), while categorical data were expressed as numbers and percentages. The Kolmogorov-Smirnov test was employed to evaluate the normality of continuous variables. In studies where two groups of data were

Table 1. Demographic characteristics of the groups

	Patient group (n=58)	Control group (n=61)	*p*
Age (year) (Mean–SD)	35,9–11,6	34,2–8,8	0.376*
Sex (n,%)			
Female	41 (70,7)	43 (70,5)	0.981**
Male	17 (29,3)	18 (29,5)	

* T-Test was used. ** Chi-square test was used.
Abbreviation: SD: Standard deviation

found to fit a normal distribution, an independent groups t-test was employed. In contrast, when the data did not fit a normal distribution, a Mann-Whitney U test was utilized for comparison. A chi-square test was employed to compare categorical data. The linear relationship between the scales was analysed utilizing the Pearson correlation test. The analyses were conducted utilizing IBM SPSS (Statistical Package for Social Sciences) version 22.0 (IBM Corporation, Armonk, NY, USA). The statistical significance level was set at $p < 0.05$. It was determined that 61 individuals per group (122 individuals in total) would be sufficient to test the null hypothesis, assuming a calculated effect size of d=0.51, an alpha error (p-value) of 0.05, and a 1-beta error (power) of 0.80. The analyses were conducted using the G*Power Statistical Program, version 3.1.9.4, developed at the University of Düsseldorf in Germany.

RESULTS

The study included 58 panic disorder patients and 61 healthy volunteers. No statistically significant difference was obtained between the mean ages of the groups (35.9 ± 11.6 vs 34.2 ± 8.8) (p = 0.376). In the patient group, 70.7% of the participants were female and 29.3% were male, while in the control group, 70.5% were female and 29.5% were male (p=0.981) (Table 1). The mean duration of education in the patient group was 11 years, while the prevalence of smoking was 25.9% in the same group. No statistically significant difference was obtained between the years of education and smoking rates in the control group.

The outcomes demonstrated that the scores for the uncontrollability and danger subscale of the MCQ-30 were higher in the patient group (20 (10-28)) than in the control group (15 (8-25)) (p <0.001). The results demonstrated that the scores on the control of thoughts subscale of the MCQ-30 were statistically significantly more elevated in the patient group [12 (5-20)] compared to the control group [10 (6-18)] (p=0.001). The results demonstrated that the cognitive awareness subscale of the MCQ-30 exhibited a contrast between the groups, with the former displaying higher scores [17.5 (7-119)] compared to the control group [14 (7-27)] (p <0.001). The DD subscale scores of the DES were seen to be statistically significant more elevated in the patient group (17.5, 7-119) compared to the control group (5, 0-40) (p=0.020). The results demonstrated that the scores on the absorption subscale of the DES were statistically significant higher in the patient group [21 (0-91)] compared to the control group [5 (0-40)} (p <0.001). The amne-

Table 2. Comparison of Metacognition Questionnaire-30 subscales, Dissociative Experiences subscales and Panic Disorder Severity Scale median scores.

	Patient group (n=58) [median (min- max)]	Control group (n=61) [median (min- max)]	*p*
MCQ-30 Positive Beliefs Subscale	12 (6-21)	12 (7-19)	0.479*
MCQ-30 Uncontrollability and Danger Subscale	20 (10-28)	15 (8-25)	<0.001*
MCQ-30 Cognitive Confidence Subscale	13,5 (6-24)	12 (6-26)	0.137*
MCQ-30 Need to Control Thoughts Subscale	12 (5-20)	10 (6-18)	0.001*
MCQ-30 Cognitive Self - Consciousness Subscale	17,5 (7-119)	14 (7-27)	<0.001*
DES DD	7,5 (0-75)	5 (0-40)	0.020*
DES Absorption	21 (0-91)	5 (0-40)	<0.001*
DES Amnesia	5 (0-70)	1 (0-15)	<0.001*
PDSS	13,5 (3-23)	-	-

Table 3. Comparison of Metacognition Questionnaire -30 subscales, Dissociative Experiences subscales and Panic Disorder Severity Scale median scores according to the presence of DD in the patient group

	DD not present (n=33) [median (min-max)]	DD present (n=25) [median (min-max)]	*p*
MCQ-30 Positive Beliefs Subscale	13 (6-17)	11 (6-21)	0.608*
MCQ-30 Uncontrollability and Danger Subscale	20 (14-27)	21 (10-28)	0.642*
MCQ-30 Cognitive Confidence Subscale	14 (6-24)	11 (6-21)	0.418*
MCQ-30 Need to Control Thoughts Subscale	12 (6-19)	12 (5-20)	0.968*
MCQ-30 Cognitive Self - Consciousness Subscale	17 (7-24)	19 (12-119)	0.095*
DES DD	3 (0-70)	15 (0-75)	0.034*
DES Absorption	16 (0-91)	25 (3-81)	0.044*
DES Amnesia	4 (0-60)	7 (0-70)	0.145*
PDSS	13 (6-23)	15 (3-22)	0.337*

* Mann-Whitney U Test was used
Abbreviation: DD: Depersonalization/Derealization, DES: Dissociative Experiences Scale, MCQ-30: Metacognition Questionnaire-30 PDSS: Panic Disorder Severity Scale

sia subscale of the DES demonstrated a statistically significant difference, with higher scores observed in the patient group (5, 0-70) compared to the control group (1, 0-15) ($p < 0.001$). The MCQ-30 cognitive confidence subscale exhibited no statistical significance in the patient group [13.5 (6-24)] compared to the control group [12 (6-26)] ($p=0.137$). The scores for the positive beliefs subscale of the MCQ-30 were similar between the two groups, and no statistically significant difference was observed ($p > 0.05$) (Table 2).

The patient cohort was divided into two groups based on the presence of DD. There were 25 patients with DD, while there were 33 patients

Table 4. Correlation of Metacognition Questionnaire-30 subscales, Dissociative Experiences subscales and Panic Disorder Severity Scale in the patient group

	N=58	MCQ-30 Positive Beliefs Subscale	MCQ-30 Uncontrollability and Danger Subscale	MCQ-30 Cognitive Confidence Subscale	MCQ-30 Need to Control Thoughts Subscale	MCQ-30 Cognitive Self-Consciousness Subscale	DES DD	DES Absorption	DES Amnesia
MCQ-30 Uncontrollability and Danger Subscale	r	,033							
	p	,806							
MCQ-30 Cognitive Confidence Subscale	r	,221	**,338****						
	p	,095	**,010**						
MCQ-30 Need to Control Thoughts Subscale	r	**,274***	**,503****	,273*					
	p	**,038**	**,000**	,038					
MCQ-30 Cognitive Self - Consciousness Subscale	r	,148	**,321***	,037	**,408****				
	p	,268	**,014**	,785	**,001**				
DES DD	r	,163	**,263***	-,010	**,308***	-,071			
	p	,221	**,046**	,942	**,019**	,596			
DES Absorption	r	,093	,241	,173	,213	-,066	**,600****		
	p	,485	,069	,193	,108	,620	**,000**		
DES Amnesia	r	,131	,249	,259*	,192	-,182	**,535****	**,706****	
	p	,329	,060	,050	,148	,171	**,000**	**,000**	
PDSS	r	-,058	-,039	-,056	**,272***	,093	,188	,146	,207
	p	,666	,772	,679	**,039**	,487	,158	,275	,119

Abbreviation: DD: Depersonalization/Derealization, DES: Dissociative Experiences Scale, MCQ -30: Metacognition Questionnaire -30 PDSS: Panic Disorder Severity Scale

without DD. In the patient population, the scores on the DD and absorption subscale of the DES were seen to be more elevated in patients with DD (15 (0-75) and 25 (3-81), respectively) compared to those without DD (3 (0-70) and 16 (0-91), respectively) (p=0.034 and p=0.044, respectively).In the patient group, no statistically significant differences were observed in the scores on the amnesia subscale of the DES between patients with DD [7 (0-70)] and patients without DD [4 (0-60)] (p=0.145).In the patient group, no statistically significant differences were observed in PDSS scores between those with DD [15 (3-22)] and those without DD [13 (6-23)] (p=0.337). In the patient group, no statistically significant differences were observed in the scores of the MCQ-30 cognitive awareness subscale between those with DD [19 (12-119)] and those without DD [17 (7-24)] (p=0.095). In the patient group, no statistically significant differences were observed in the scores of the MCQ-30 positive beliefs subscale, MCQ-30 uncontrollability and danger subscale, MCQ-30 cognitive confidence subscale, and MCQ-30 controlling thoughts subscale according to the presence of DD (p>0.05) (Table 3).

In the patient group, a positive, low, moderately strong correlation was observed between the uncontrollability and danger subscale of the MCQ-30 and the cognitive confidence subscale of the MCQ-30 (r = 0.338, p = 0.010).In the patient group, a positive, moderately strong correlation was observed between the scores on the uncontrollability and danger subscale of the MCQ-30 and the thoughts control subscale of the MCQ-30 (r=-0.503, p < 0.001). In the patient group, a positive, low, moderately strong correlation was observed between the scores of the MCQ-30 uncontrollability and danger subscale and the MCQ-30 cognitive awareness subscale (r = 0.321, p = 0.014). In the patient group, a positive, low, moderately strong correlation was observed between the scores of the MCQ-30 thoughts control subscale and the MCQ-30 cognitive awareness subscale (r = -0.408, p = 0.001). A positive, low, moderately strong correlation was observed between the control subscale of the MCQ-30 need to control thoughts subscale and the DD subscale scores of the DES (r = 0.308, p = 0.019). A positive, strong correlation was observed between the DD subscale of the DES and the absorption subscale scores of the DES (r=0.600, p<0.001). A positive, strong correlation was observed between the scores of the DD subscale of the DES and the absorption subscale of the DES (r = 0.706, p < 0.001). A positive, very strong correlation was observed between the absorption subscale of the DES and the amnesia subscale scores of the DES (r=0.535, p<0.001) (Table 4).

DISCUSSION

A principal purpose of the study was to investigate the metacognitive aspects differentiating the groups with and without DD in the patient cohort. In the patient group, a positive, low, moderately strong correlation was observed between the scores on the MCQ-30 thoughts control subscale and the scores on the DD subscales of the DES. This could be clarified by the actuality that individuals who are confronted with a distressing situation such as DD, which is challenging to prevent and control, may engage in more frequent and elaborate cognitive processes related to the regulation and management of their emotional response to this situation.

The metacognitive theory posits that psychological disturbances persist due to the effects of the thought process, CAS, on emotional experiences and knowledge. CAS contributes to the keeping of a negative self-concept and the perception of threat through specific pathways. CAS is associated with the activation of positive and negative metacognitive beliefs. The distinction between the metacognitive and ordinary cognitive levels allows for the experience of inner occasions, such as thoughts, beliefs, and emotions, in different modes, including cognitive and metacognitive. Despite the proposal of a metacognitive model for certain psychiatric disorders, no such model has yet been put forth for panic disorder. While there have been previous studies examining metacognitive factors in panic disorder, there is currently no research comparing patients with and without DD symptoms among those diagnosed with panic disorder (13).

A sociodemographic analysis of the study cohort revealed that 70.7% of patients were female, 29.3% were male, and the mean age was 35.9 ± 11.6 years (Table 1). The sociodemographic data of our study

appear to align with those reported in the publications (10,11,18,19).

In studies that have employed a screening approach to identify DD symptoms during panic attacks, the frequency of DD symptoms has been observed to range from 24% to 70%. However, in our study, DD symptoms were identified in approximately 56% of the patient group (10,11,19,20). The prevalence rates of DD found in our study may be influenced by cultural differences of the patient group.

The uncontrollability and danger subscales of the MCQ-30 exhibited differences between the groups in our study. In a study performed in Turkey, the metacognitions of panic disorder patients were evaluated. The outcomes revealed that the uncontrollability and danger subscale was used more frequently, with a large effect size, while the need to control thoughts subscale was used more frequently, with a medium effect size. In the same investigation, no meaningful contrast was identified between the groups in cognitive confidence, positive beliefs and cognitive awareness subscales (21). In a study conducted by Cucchi et al. a meaningful contrast was identified between the 'uncontrollability and danger' and 'need to control thoughts' subscales. The researchers posited that this discrepancy may be attributed to the point that individuals diagnosed with panic disorder tend to perceive a necessity to regulate their cognitive processes to avert negative cognitions about apprehension and to avert catastrophic scenarios. The researchers proposed that the patients efforts to cope with the fear of losing control to prevent a loss of control activated the cognitive attentional syndrome, resulting in a vicious cycle and the perpetuation of the pathology (22). In a study conducted by Morrison and Wells, it was observed that patients with panic disorder exhibited elevated scores on the subscales of uncontrollability and danger and need to control thoughts. One might posit that individuals with panic disorder seek to maintain cognitive control to feel safe. However, this pursuit can inadvertently perpetuate a vicious cycle, as they ultimately believe that worry is unmanageable (3,23). The increase in DD symptoms may reinforce the belief that one cannot control one's thoughts, potentially intensifying the severity of the attacks and creating a vicious cycle.

In our study, the Cognitive Awareness Subscale, which assesses an individual's ability to monitor and regulate their thought processes, showed a meaningful contrast between groups. This indicates that the patient group, ensured the continuous activation of CAS, thereby entering into a vicious cycle of being alert to dangers at all times.

According to the existing literature, the cognitive confidence scale scores, related to a deficiency of confidence in one's memory and attention abilities, were not statistically significant. This discrepancy in comparison to other studies may be attributed to the generally scarce level of education among the patient group. Concerning the positive beliefs subscale, which encompasses the notion that worrying facilitates the formulation of plans or the resolution of issues, no statistically significant discrepancy was observed between groups. The fact that panic disorder is characterised by sudden and unexpected panic attacks may explain the lack of difference between groups in positive beliefs.

In the field of psychiatry, dissociation is defined as an unconscious defensive mechanism involving the other psychic activities of the individual in any group of mental or behavioural processes. Dissociative symptoms are among the most prevalent in a spectrum of mental health conditions. In the present study, the DES was employed to ascertain the prevalence of dissociative symptoms other than dissociative amnesia in patients with and without DD symptoms, as well as in the control group. A statistically significant contrast was observed between the groups on all subscales of the DES scores for absorption, amnesia and DD. A further study conducted in Turkey investigating the comorbidity of dissociative disorders in patients with panic disorder lends support to our findings (24). In other studies, no meaningful correlation was seen between the severity of panic disorder and patients with DES scores (25,26). In another investigation, it was posited that the utilisation of dissociation as a defensive mechanism in patients exhibiting elevated dissociative scale scores may potentially result in a reduction in the severity of the panic disorder (27). Nevertheless, some litera-

ture suggests that a high dissociative level is associated with a poor answer to cognitive behavioural therapy (CBT) (25).

According to metacognitive theory, the foundation of psychological disorders is a detrimental mode of thinking, designated as CAS. CAS facilitates the perpetuation of negative thought patterns. CAS is characterised by repetitive thinking patterns, including worry or rumination, and a tendency to focus attention on threats and dysfunctional coping mechanisms. The effects of CAS are also evident in the context of panic disorder. Anxiety is heightened when one is preoccupied with the prospect of future attacks. The monitoring of bodily sensations serves to foster an environment conducive to the development of the illness, by increasing the likelihood of subsequent attacks. Therefore, individuals who exhibit a proclivity for cognitive and attention-focused response patterns are at an elevated risk of perpetuating anxious arousal and experiencing recurrent panic attacks. CAS is subject to the influence of erroneous beliefs on cognitive processes. Two distinct domains of metacognitive beliefs are implicated in this phenomenon. Such beliefs can be classified as either positive or negative metacognitive beliefs (13). Positive metacognitive beliefs are associated with the perceived utility of worry, rumination, threat scanning, and other related processes. The other domain pertains to the negative significance and meaning attributed to internal cognitive events. Negative metacognitions encompass beliefs communed to the uncontrollability of thoughts and those about the perceived threat, importance, and meaning of internal cognitive events (28). Such negative metacognitions result in unsuccessful control attempts and the formation of negative and menacing interpretations of cognitive events, which in turn serve to perpetuate the maintenance of the disorder (12). Therefore, as predicted in panic disorder, high scores were observed in the need to control thoughts subscale and the uncontrollability and danger subscales of the metacognition scale in our study.

The cognitive behavioural therapy model posits that panic attacks are caused by subjectively perceived intense anxiety reactions, rather than objective danger. According to Clark's model, the occurrence of triggers results in an elevation of the level of anxiety, which subsequently gives rise to cognitive misinterpretations (6). This results in a further increase in anxiety, a more pronounced somatic expression of anxiety, and the interpretation of these sensations as catastrophic. The perpetuation of catastrophic thoughts is also a consequence of this process. The objective of cognitive interventions is to facilitate the correction of patients thoughts and beliefs regarding the meaning and results of somatic manifestation associated with panic and anxiety (29). By metacognitive theory, dysfunctional metacognitive beliefs encompass the confirmation of catastrophic misinterpretations that are inevitable in patients diagnosed with panic disorder. It is therefore proposed that metacognitive therapy may prove an efficacious intervention for patients with panic disorder. However, an examination of panic disorder patients at the symptom level revealed no significant differences between those who exhibited DD and those who did not. This finding suggests that regardless of the symptoms experienced by an individual during an attack, CAS is exclusively focused on the attack itself. It is therefore proposed that metacognitive techniques may prove to be of significant benefit to patients diagnosed with panic disorder. These techniques include attentional training, which involves processing non-self-related external material to prevent self-focused perseverative processing in patients with DD; the refocusing of situational attention, which is used to bring new information to consciousness and modify beliefs by preventing attention patterns that maintain unrealistic threat perception; and the technique of distanced self-contemplation, which concerns awareness of internal cognitive events. It may be the case that patients exhibiting DD with a more pronounced severity of panic disorder may derive greater benefit from these techniques.

The extant literature indicates that patients diagnosed with panic disorder who exhibit heightened levels of catastrophic thinking tend to demonstrate suboptimal responsiveness to cognitive restructuring techniques and cognitive behavioural therapy. Meuret et al. (2010) reported that they found benefits in the patient group they followed with acceptance and stability therapy, which is a type of therapy based on mindfulness (30). They suggested that this type of therapy could be trialed in patients who do not profit from classical CBT. In another study, a notable lessening in the severity of panic

disorder was observed following the implementation of mindfulness-based cognitive therapy (31). These findings reinforce our hypothesis that metacognitive techniques are crucial for the effective treatment of panic disorder, particularly mindfulness and attention-oriented interventions, which are especially beneficial for patients with high symptom levels, including those with DD.

The cross-sectional character of the study and some scales completed by the participants themselves, the relatively low educational level of the groups participating in the study, and the fairly small number of patients contained in the study denote potential limitations of the study. While there are studies in the literature that have evaluated dissociative findings and metacognitions separately in patients with panic disorder, our study is the foremost, to the best of our knowledge, to examine these two variables together.

The chief purpose of our research was to examine and debate the hypothesis that DD symptoms engender a metacognitive distinction in patients diagnosed with panic disorder. Additionally, we sought to ascertain the prevalence of dissociative symptoms experienced by these individuals outside of the attack despite the presence of DD at the symptom level. We desired to examine the relationship between metacognitions and the severity of panic disorder symptoms. Finally, we sought to confine the potential efficacy of metacognitive interventions in this patient population.

The findings of our study indicate that, although a meaningful metacognitive contrast was identified between panic disorder patients and healthy participants, no metacognitive difference was discerned between those who exhibited DD during the attack and those who did not. It is postulated that this is because, during the attack, CAS is wholly directed towards the attack itself. It was observed that individuals within the patient group who exhibited DD symptoms also demonstrated a higher prevalence of dissociative symptoms in the absence of the disorder.

In consideration of the aforementioned information, it is postulated that metacognitive therapy may prove efficacious in patients exhibiting more pronounced panic symptoms. This is predicated on the assumption that metacognitive beliefs that perpetuate catastrophic thinking are indeed effective. The attention training technique, which constitutes one of the fundamental techniques of metacognitive therapy, along with the attention refocusing technique and distant awareness techniques, which are the antithesis of CAS, may prove advantageous for these individuals. Nevertheless, further controlled studies are required in this area.

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Informed Consent

Ethics committee approval was obtained from the Health Sciences University Hamidiye Scientific Research Ethics Committee with the meeting date 07/05/2021, meeting number 2021/16 and decision number 16/4. All procedures followed were in accordance with the ethical standards stated in the Helsinki Declaration of 1975 (in its most recently amended version). Informed consent was obtained from both healthy volunteers and the patients informed consent form was signed by themselves. The authors thanks the all participants for his/her consent.

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Disclosure statement /Conflict of Interests

The authors declare no conflict of interest.

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Earthquake fear, sleep quality, and intolerance of uncertainty: A study of adults with earthquake experience

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SUMMARY

Objective: The aim of this study was to examine the mediating role of intolerance of uncertainty in the relationship between fear of earthquake and sleep quality in individuals with direct or indirect earthquake experience.

Method: A total of 351 adults who directly or indirectly experienced the 6 February earthquake participated in the study. Data were obtained with the Earthquake Fear Scale, Insomnia Complaints and Sleep Quality Baseline Scale and Intolerance of Uncertainty Scale. The relationships between the variables were examined using the basic mediation model.

Results: In this study, fear of earthquake (β= .12**, 95% CI = [.03, .20], t=2.89, p<.01) and intolerance of uncertainty (β= .12***, 95% CI = [.06, .17], t=4.20, p<.001) had a positive and significant effect on insomnia complaints and sleep quality. In addition, intolerance of uncertainty mediated the relationship between fear of earthquake and insomnia complaints and sleep quality (β= .09***, 95% CI = [.05, .14], SH=.02).

Discussion: This study suggests that the increase in insomnia complaints and sleep quality problems in individuals with earthquake experience may be related to the increase in earthquake fear and intolerance of uncertainty. In this direction, it can be suggested that experts working with individuals with earthquake experience should focus on intolerance of uncertainty and fear of earthquake while working with sleep problems. It is also recommended that the experiences of individuals under the age of 18 should be examined and more longitudinal studies should be planned for future studies.

Key Words: Earthquake fear, Sleep quality, Insomnia problems, İntolerance of uncertainty, The mediating role.

INTRODUCTION

Humanity has faced challenging life events since its existence. One of these challenging life events is earthquakes, one of the types of natural disasters. Earthquakes, which are frequently experienced in many parts of the world, also manifest themselves in different regions and with different severity in Turkey. Earthquakes bring along a disaster life that involves different challenging processes before and after. The February 6, 2023 earthquake centered in Kahramanmaraş can be given as an example of this situation. Because it can be said that the Kahramanmaraş earthquake was effective in a wide geography in the physical dimension (1), while it affected almost all of Turkey in social and psychological terms. As a matter of fact, it is stated that the earthquake had long-lasting effects on those who directly experienced the earthquake as well as those who indirectly witnessed what happened in that region (through media, etc.) (2). It is emphasized that these effects cannot be limited to physical damage and loss of life, but should also be evaluated in social, cognitive, psychological and economic dimensions (3,4,5,6,7). The fact that individuals experiencing the earthquake exhibit emotional, cognitive, physical and social responses at different levels supports this (8). This result may be

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considered to indicate the psychological effects of the earthquake. It is noteworthy that after the earthquake, individuals' level of satisfaction with life decreased compared to before the earthquake, regardless of their personality characteristics and sociodemographic status (9). In addition, it is observed that individuals who experience earthquake experience depression, depression and nervous disorder (10). It is also reported that individuals who experience earthquake-like disasters experience less positive emotions and more negative emotions (11). One of these negative emotions is fear of earthquake.

Fear of earthquake is one of the symptoms that can be effective on the lives of individuals affected by earthquake after observation of what happened during the earthquake (12). It is considered important to investigate earthquake fear, which is related to the emotional reactions and mental health of individuals during the earthquake process, which is a challenging life event (13). In this context, earthquake fear includes emotional fear reactions such as disturbing thoughts and somatic fear reactions such as heart palpitations (14). When the fear of earthquake experienced by individuals is evaluated from the perspective of classical conditioning, it can be said that the earthquake is an unconditioned stimulus, and stimuli such as earthquake-induced power outages, experiencing the earthquake at home and being caught while asleep are conditioned stimuli (15). For this reason, avoidance behaviors such as hesitating to enter the house after an earthquake, wanting to keep the lights on, and staying awake with the fear of an earthquake reinforce the fear of earthquakes, and small-sized tremors lead to the fear of earthquakes to persist for a long time (16). In addition, fear of earthquakes mediates the traumatization of individuals after an earthquake and indirectly increases depression (17), triggers self-efficacy and posttraumatic stress symptoms (18), and even increases the risk of individuals experiencing Posttraumatic Stress Disorder (PTSD) (19,20). Prolonged exposure to fear may cause individuals to feel certain effects more intensely. One of these effects is sleep problems and difficulty in sleeping, which manifest themselves in different developmental periods (21,22,23). As a matter of fact, it was observed that individuals affected by the earthquake most frequently experienced fear/anxiety and insomnia problems after the Kahramanmaraş-centered earthquake that recently occurred in Turkey (24). Therefore, it can be said that it is important to address the relationship between fear and sleep problems experienced after an earthquake, which can affect people of all ages.

It is observed that individuals who experience earthquake experience sleep delay and problems in sleep quality. In addition, the stress levels of individuals with sleep delay increase, and decreased sleep quality or sleep disorders may indicate high levels of depression and anxiety (21). In the post-earthquake period, many individuals with insomnia had to use sleep-related medication (12). Similarly, it has been emphasized that the sleep quality of women, young people, those whose houses were damaged in the earthquake, those who lost their loved ones and those with a history of psychiatric illness were negatively affected after the earthquake (24). In addition to deterioration in sleep quality after the earthquake, disturbing nocturnal behaviors such as nightmares related or not related to the earthquake, terror attacks or screams during sleep are observed and the effects may continue for many years (25). Therefore, it is important to investigate the reasons behind insomnia and decreased sleep quality after earthquake-like disasters. Because investigating whether individuals affected by the earthquake process will suffer from insomnia and poor sleep quality can facilitate the understanding of the conditions that may help them to have the desired sleep quality (26). Therefore, it is important to address the difficulties related to sleep quality (27), which occur after natural disasters such as earthquakes and may last for many years, in both epidemiologic and psychiatric studies (28). In this direction, it is emphasized that intolerance of uncertainty is one of the concepts that can be investigated in relation to sleep problems to be experienced during the earthquake (29).

Intolerance of uncertainty, which is triggered by the perception of the absence of important, sufficient or clear information about a situation and consequently defined as a dispositional inability to withstand a negative reaction (30), is seen as a transdiagnostic factor that occurs in emotional disorders and is associated with difficulties in the regulation

of emotions (31). In addition, it is emphasized that intolerance of uncertainty, which is a dispositional trait that emerges as negative beliefs about uncertainty and its consequences (32), is associated with social anxiety, obsessive-compulsive disorder, depression, panic, eating disorders and anxiety (33). At the same time, while intolerance of uncertainty is negatively associated with PTSD, it is positively associated with posttraumatic development and it is stated that it is important to address it in order to understand the experiences of individuals after the earthquake (34). As a matter of fact, it is observed that anxiety and depression, which may occur intensely during the earthquake process (35), increase insomnia and negatively affect sleep quality, and sleep problems are thought to be related to intolerance of uncertainty (36). Although there are studies indicating that there are post-earthquake sleep problems in Turkey (37,38), there are no studies examining the relationship between sleep quality and sleep problems with fear of earthquake and intolerance of uncertainty. Considering that Turkey is an earthquake country, it can be thought that investigating the effects of post-earthquake fear on individuals' sleep life is important in terms of taking relevant measures. Because it is quite possible that people who live in regions where earthquakes are frequently experienced or who have previous earthquake experience may experience earthquake fear. Fear of earthquake causes different physical, emotional and psychological symptoms and affects sleep status (38). Similarly, it has been reported that sleep quality of individuals with earthquake fear is negatively affected and it is emphasized that different studies are needed to understand the relationship (37). It may be considered necessary to examine the effect of intolerance of uncertainty in the relationship between fear of earthquake and sleep quality and insomnia. Because it has been emphasized that the use of negative coping strategies after natural disasters such as earthquakes is related to intolerance of uncertainty (39). It is seen that there are different studies on the relationship between fear of earthquake and intolerance of uncertainty (34), fear of earthquake and sleep quality (37,40,41) and sleep quality and intolerance of uncertainty (29,42,43) and the importance of the relationship between variables is emphasized. Despite all these explanations, there is no study addressing the effect of intolerance of uncertainty on the relationship between earthquake fear and sleep quality. In summary, in this study, it is thought to be important to examine the mediating effect of intolerance of uncertainty in the relationship between earthquake fear and sleep quality. It has been suggested that intolerance of uncertainty, which appears frightening in terms of its definition and consequences, can be tolerated, perhaps accepted and embraced (44). It seems possible to cope with intolerance of uncertainty by exploring guided by CBT approaches or by intentionally experiencing uncertainty in the absence of threat (45). In this respect, it is thought that knowing the mediating effect of intolerance of uncertainty while intervening in fear-related sleep problems and sleep quality that may be experienced after earthquake experience will contribute to the related intervention studies. As a matter of fact, Turkey has recently experienced a major earthquake and research results have been obtained that insomnia is experienced and sleep quality is affected after the earthquake experience (37,38). Despite this, there are no studies that examine in detail the experiences that may have an impact on sleep quality of individuals experiencing the earthquake process. Sleep is a vital necessity for human life. It is emphasized that sleep quality may be affected and sleep problems may be experienced after challenging life events such as earthquakes. In this process, it may be important to address the relationship between fear, one of the basic emotions, which is an important element in human life, and sleep quality. Because it is stated that fear of earthquake may be experienced intensely after earthquake experience (13,14). It is thought to be valuable in terms of revealing the relationship between the two elements and emphasizing the importance of emotion regulation studies to control earthquake fear in order to improve sleep quality and cope with sleep problems. However, individuals with low tolerance for uncertainty may develop intense fear, especially for events that are difficult to predict, such as earthquakes. Time-oriented conditioning (15), which will accompany the difficulties in emotion regulation, may make it difficult to cope with the uncertainty of an earthquake that may occur at night, making it difficult to stay awake or have difficulty sleeping. This situation indicates that intolerance of uncertainty may be effective between earthquake fear and sleep status.

The lack of a study examining this relationship makes it difficult to fully explain the relationship between the variables. In this respect, the results of the research are considered important in terms of supporting mental health professionals working with individuals affected by the process and experiencing sleep problems to understand the relationship of the problem with intolerance of uncertainty and fear of earthquake and to guide the interventions to be carried out. In line with the explanations, the questions sought to be answered in the research are as follows:

- Do sleep quality and insomnia complaints differ according to direct experience of the February 6, 2023 earthquake?

- Does intolerance of uncertainty have a mediating role in the relationship between fear of earthquake and sleep quality and sleep problems?

METHOD

Research Model

In this study, causal-comparison research, which is among the descriptive research types, was used as a model. Firstly, it was examined whether experiencing the earthquake beforehand and directly experiencing it would create a significant difference on sleep quality and insomnia complaints. The hypotheses formed in this direction are as follows:

Hypotheses

- H1: Sleep quality and insomnia complaints of adults differ significantly according to their prior experience of earthquake?

- H2: Sleep quality and insomnia complaints of adults differ significantly according to their direct experience of earthquake?

Then, based on the theoretical framework, the relationship between adults' earthquake fear levels, intolerance of uncertainty levels, insomnia complaints and sleep quality variables was examined using the basic mediation model. In this context, the research model is presented in Figure 1:

Hypotheses:

- H3: Adults' fear of earthquake positively affects intolerance of uncertainty.

- H4: Adults' fear of earthquake positively affects poor sleep quality and sleep complaints.

- H5: Intolerance of uncertainty positively affects poor sleep quality and sleep complaints.

- H6: Intolerance of uncertainty has a mediating role in the relationship between fear of earthquake and sleep quality and insomnia complaints of adults.

Study Group

The study group of this research was determined by convenience sampling. However, information

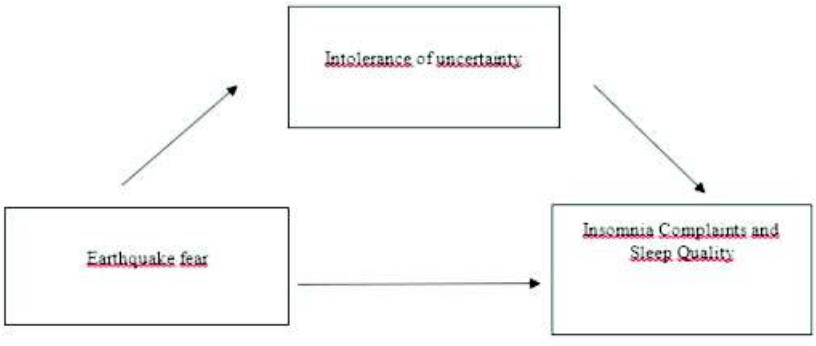

Figure 1: Research Model

about the research process was given before data collection, and care was taken not to collect data from individuals with traumatic symptoms related to the earthquake process. The data consisted of 351 adult participants aged between 18 and 64 who voluntarily responded to the form prepared through Google Form between November and December 2023. The mean age of the participants was 32.75 years and the standard deviation was 9.23 years.

Data Collection Tools

Personal Information Form: The form developed by the researchers consists of demographic information such as gender and age as well as two closed-ended questions about earthquake experience. These questions are presented below.

- Before the February 6, 2023 earthquake, did you have a direct earthquake experience?

- Did you directly experience the February 6, 2023 earthquake? (Were you in one of the 11 cities during the earthquake?)

Earthquake Fear Scale: The Earthquake Fear Scale is a 7-item scale adapted by Satıcı et al. (46) for participants aged 18 years and over to determine the degree of experiencing earthquake fear. The lowest score that can be obtained from the scale is 7 and the highest score is 35. There is no reverse coded item in the earthquake fear scale. The adaptation process of the scale was carried out in three stages and the analyses were carried out with the data obtained from 407 participants in the first stage, 505 participants in the second stage and 382 participants in the third stage. The Earthquake Fear Scale was created by revising the Fear of COVID-19 Scale developed by Ahorsu (2022) and others. Confirmatory factor analysis was conducted to test the construct validity of the scale and it was concluded that the scale had a single-factor structure. It was reported that the scale items accounted for 54.75% of the variance explained. The CFI value of the seven-item earthquake fear scale was calculated as 0.922, NFI value as 0.914 and SRMR value as 0.053. The Cronbach's alpha reliability coefficient of the scale was found to be .89 in the adaptation study. In this study, the Cronbach's alpha reliability coefficient of the earthquake fear scale was .89.

Intolerance of Uncertainty Scale: The Intolerance of Uncertainty Scale was developed by Carleton et al. in 2007. The scale was adapted into Turkish by Sarıçam et al. A total of 593 university students participated in the adaptation of the scale into Turkish. There were no reverse coded items in the scale. The scale can be scored according to sub-dimensions as well as total score. The scale has a score range between 12 and 60. The higher the score, the higher the intolerance of uncertainty. The KMO sampling compatibility coefficient of the scale was .85 and Barlett's test $\chi 2$ value was 5052.53 ($p < .001$, sd= 66). In the confirmatory factor analysis applied for the construct validity of the scale, it was found that 12 items were collected in two dimensions (prospective anxiety, inhibitory anxiety) consistent with the original form ($\chi^2 = 147.20$, sd= 48, RMSEA=.073, CFI=.95, IFI=.95, GFI=.94, SRMR=.046). The factor loadings of the scale ranged between .55 and .87; Cronbach's alpha internal consistency coefficient was .88 for the whole scale, .84 for the prospective anxiety sub-dimension, and .77 for the inhibitory anxiety sub-dimension. In this study, Cronbach's alpha internal consistency coefficient was .83 for the prospective anxiety sub-dimension, .88 for the inhibitory anxiety sub-dimension and .90 for the whole scale.

Insomnia Complaints and Sleep Quality Baseline Scale: The Insomnia Complaints and Sleep Quality Baseline Scale was developed by Gomes et al. in 2015. The scale was adapted into Turkish by Ağar et al. The adaptation of the scale into Turkish was conducted with data obtained from 180 individuals aged between 20 and 40 years. The scale consists of seven items and has a two-factor structure. The two-factor structure is also mentioned in the original study of the scale. The variance explained by the two factors together was calculated as 61.43%. The variance explained by the first factor alone was 42.52% and the variance explained by the second factor alone was 18.91%. When calculating the scale scores, item 6a and item 6b are reverse scored. These items consist of positive statements about sleep. The other five items in the scale consist of negatively worded statements expressing

Table 1. Findings Related to Descriptive Statistics

Variables	1	2	3	$\bar{}$	SS	Skewness	Kurtosis
1. Fear of earthquakes	-			22.89	6.72	-.27	-.60
2. Intolerance of uncertainty	.55**	-		39.52	9.83	-.10	-.28
3.Insomnia complaints and sleep quality	.31**	.34**	-	12.58	4.60	.25	-.09

sleep problems. A high score on the scale means a decrease in sleep quality and an increase in insomnia complaints. Cronbach's alpha coefficient of the scale was calculated as .75 for the total dimension of falling asleep and waking up problems. In this study, the Cronbach's alpha coefficient of the scale was calculated as .71.

Data collection

Within the scope of the research, ethics committee permission was first obtained (02.10.2023/230669), and then the data were collected by presenting an informed consent form to the participants.

The data collection tools used in the study and the research participation form consisting of the personal information form prepared by the researchers were applied to 353 participants aged between 18 and 64 in the data group between November and December 2023 via Google Forms. The link to participate in the research was shared by the researchers on various social media channels and chat groups, and in this way, the research participants were reached randomly. The data obtained through Google Forms were transferred to the Google Forms Excel Spreadsheet, and the data in the Excel spreadsheet were transformed into the SPSS 22.00 package program ready for use.

Data analysis

Within the scope of the research, data were first collected from 353 participants. It was checked whether there were outliers among the data. Mahalanobis distance method was used to identify outliers. The control of outliers was calculated through the Mahalanobis distance, and accordingly, since the responses of two participants were among the outliers, the final data was realized with the responses obtained from 351 participants. The analysis of the data collected within the scope of the research was carried out with SPSS 22.00 package program. In order to test the mediation model, Hayes PROCESS MACRO Plugin, which is included in the SPSS 22.00 package program, was used. Bootstrap method, Pearson correlation coefficient and descriptive statistics were used to determine the mediation model. Bootstrap analyses to determine whether the mediation effects are statistically significant were also performed with the MACRO plug-in. Estimations were made according to the 95% confidence interval.

RESULTS

Within the scope of the research, descriptive statistics of the variables were analyzed first. Table 1 shows the descriptive statistics (correlation, arithmetic mean, standard deviation, skewness and kurtosis values) of the variables.

When Table 1 is examined, it is seen that the correlation between the variables varies between .31 and .55, and the tolerance (0.70) and VIF (1.42) values do not contain a correlation relationship that indicates a multicollinearity problem. In addition, the skewness and kurtosis coefficients of the variables were between -.60 and .25 and the data were normally distributed.

Within the scope of the study, the participants were asked whether they had experienced an earthquake before February 6 and whether they had experienced the February 6, 2023 earthquake. The relationship between the participants' responses to these items and sleep quality and waking problems was analyzed by independent samples t-test. Table 2 below shows the independent samples t-test results regarding the relationship between the participants' earthquake experiences before February 6, and Table 3 shows the independent samples t-test results regarding the relationship between the participants' direct experience of the February 6 earthquake and sleep quality and waking problems.

Levene's test statistic was used to examine whether the variances were distributed homogeneously,

Table 2. 6 Independent Samples t Test Results Regarding Sleep Quality and Waking Problems According to Direct Experience of Another Earthquake Before the February 2023 Earthquake

	Before the February 6, 2023 earthquake, did you have any direct experience of another earthquake? Yes (n = 225)		No (n = 126)				
Variable	$\bar{x}$	SS	$\bar{x}$	SS	sd	T	p
Sleep quality and waking problems	12.19	4.45	13.27	4.79	349	-2.120	.04*

Note. *p < .05

which is a prerequisite for conducting an independent samples t test, and since the Levene's test value was .44 (>.05), it was concluded that the variances were distributed homogeneously and the independent samples t test could be performed. When Table 2 is examined, it is concluded that people who did not directly experience an earthquake before the February 6, 2023 earthquake ($\bar{x}$=13.27) had significantly (p <.04) more problems with sleep quality and waking up than the participants who directly experienced an earthquake before the February 6, 2023 earthquake ($\bar{x}$=12.19).

Levene's test statistic was used to examine whether the variances were distributed homogeneously, which is a prerequisite for conducting an independent samples t test, and since the Levene's test value was .86 (>.05), it was concluded that the variances were distributed homogeneously and the independent samples t test could be performed. When Table 3 is examined; it is seen that there is no significant difference (p<.05) between the mean scores of the participants according to their direct experience of the February 6, 2023 earthquake. Although participants who directly experienced the February 6, 2023 earthquake reported that they had more problems with sleep quality and waking up than those who did not experience this earthquake, this difference was not significant.

The main hypothesis of the study is to test the mediating role of intolerance of uncertainty in the relationship between fear of earthquake and sleep quality and sleep problems. Model 4 from the PROCESS Macro Model developed by Hayes (49) was used to test the hypothesis. Accordingly, the independent variable of the study was fear of earthquake (X), the dependent variable was insomnia complaints and sleep quality (Y), and the mediating variable was intolerance of uncertainty (M). In order to conduct mediation analysis, some assumptions must be fulfilled. These are the existence of a significant relationship between the dependent variable and the mediator variable, the existence of a significant relationship between the independent variable and the mediator variable, and the existence of a significant relationship between the independent variable and the dependent variable

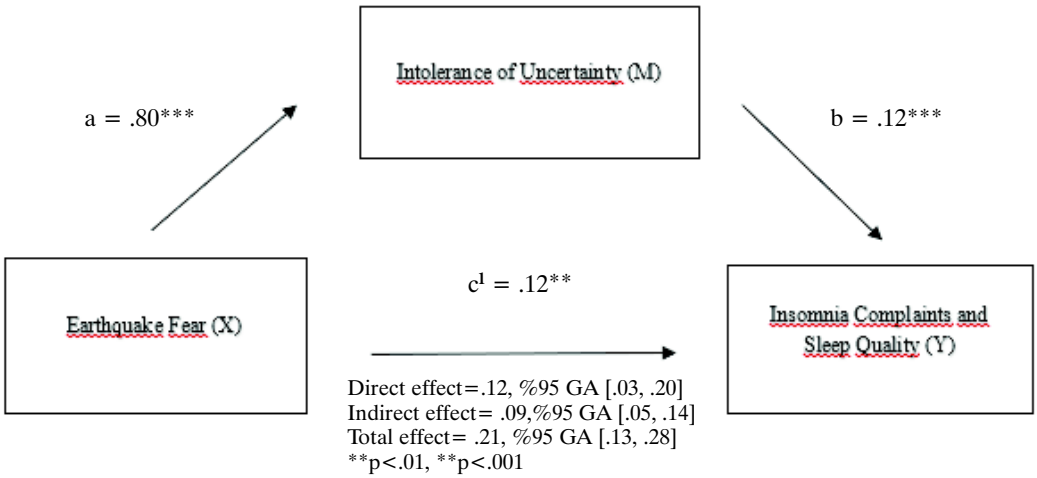

Figure 2. Mediating Role of Intolerance of Uncertainty in Experiencing Fear of Earthquake and Insomnia Complaints and Sleep Quality Related Problems. Model-4

Table 3. February 6, 2023 Independent Samples t Test Results on Sleep Quality and Waking Problems According to Direct Experience of the Earthquake

	Did you directly experience the February 6, 2023 earthquake? Yes (n = 163)		No (n = 188)				
Variable	$\bar{}$	SS	$\bar{}$	SS	sd	*T*	*p*
Sleep quality and waking problems	12.65	4.55	12.52	4.65	349	.27	.79

(50). However, it is possible to mention two types of mediation. These are full mediation and partial mediation. While full mediation is when the relationship between the independent variable and the dependent variable is found to be insignificant when the mediator variable is included, partial mediation is when the relationship between the independent variable and the dependent variable is reduced with the inclusion of the mediator variable (51). After the assumptions of mediation analysis were met, the analyses were conducted. The mediation model is presented in Figure 2 below.

Figure 2 shows that fear of earthquake significantly predicts intolerance of uncertainty, intolerance of uncertainty significantly predicts insomnia complaints and sleep quality, and finally fear of earthquake significantly predicts insomnia complaints and sleep quality. In addition, the direct effect (B=.12, 95% CI [.03, .20], indirect effect (B= .09, 95% CI [.05, .14] and total effect (B=.21, 95% CI [.13, .28]) between fear of earthquake and insomnia complaints and sleep quality are significant. The values related to the effects between the variables of the mediation model examined in the study are given in Table 4 below. The significance of the effects in the mediation model was evaluated with 5000 Boostrap samples. Estimations were made at 95% confidence interval.

Table 4 shows that fear of earthquake (β= .12**, 95% CI = [.03, .20], t=2.89, p<.01) and intolerance of uncertainty (β= .12***, 95% CI = [.06, .17], t=4.20, p<.001) have a positive and significant effect on insomnia complaints and sleep quality. In addition to these findings, the indirect effect of fear of earthquake on insomnia complaints and sleep quality was found to be positive and significant, and intolerance of uncertainty mediated the relationship between fear of earthquake and insomnia complaints and sleep quality (β= .09***, 95% CI = [.05, .14], SH=.02).

As a result, it can be said that intolerance of uncertainty has a partial mediating role in the relationship between fear of earthquake and insomnia complaints and sleep quality. As the participants' fear of earthquake and intolerance of uncertainty increased, their complaints of insomnia and problems in sleep quality increased. In other words, the increase in insomnia complaints and problems in sleep quality is associated with the increase in fear of earthquake and intolerance of uncertainty.

DISCUSSION

This study examines the relationships between individuals' fear of earthquakes, sleep quality/insomnia problems and intolerance of uncertainty. In this direction, the experiences of individuals after the recent earthquake in Turkey on February 6, 2023 were tried to be understood. First, the relationship between sleep problems after the earthquake and the earthquake experience was examined. It was concluded that individuals who did not directly experience an earthquake before the February 6, 2023 earthquake had more problems with sleep

Table 4. Values Regarding the Effects Between Variables of the Mediation Model

Variables		Beta	SE	Minimum Confidence Interval	Maximum Confidence Interval
Fear of Earthquake (X) and Sleep Quality (Y)	Insomnia Complaints	.12**	.04	.03	.20
Earthquake Fear (X)	Uncertainty	.80***	.07	.65	.92
Intolerance (M)					
Intolerance of Uncertainty (M) Complaints and Sleep Quality (Y)	Insomnia	.12***	.03	.06	.17
Fear of Earthquakes Insomnia Complaints and Sleep Quality	Intolerance of Uncertainty	.09***	.02	.05	.14
Total Impact		=.21 %95 GA [.13, .28]			

**p< .01, ***p<.001, n=351, SE= standard error, bootstrap sample=5000, unstandardized beta coefficient (Beta) reported.

quality and insomnia than individuals who directly experienced an earthquake before the February 6, 2023 earthquake. It is emphasized that people living in regions where earthquakes are frequently experienced or who have previously experienced earthquakes may show different physical, emotional and psychological symptoms and experience sleep problems because they experience earthquake fear more intensely (38). Nevertheless, the findings of this study point to a different point. Individuals with no previous earthquake experience are more likely to have decreased sleep quality and increased sleep problems. This result may indicate that individuals who have not experienced the earthquake closely before show more intense emotional reactions and experience uncertainty more intensely. As a matter of fact, it is noteworthy that many individuals experience severe insomnia as a result of overstimulation in the post-earthquake period (12). Similarly, the relationship between intolerance of uncertainty and sleep quality and sleep problems has been emphasized (29). In this respect, it is thought that if individuals who experience the earthquake for the first time have difficulty in making sense of these first experiences and do not have experience in the level of tolerance for uncertainty, it may make it difficult for them to cope with the earthquake experience and the overstimulation they will experience may decrease sleep quality and increase sleep problems compared to other individuals.

Another situation examined in this study is the relationship between direct earthquake experience and sleep problems and sleep quality. In this direction, it is noteworthy that even though individuals who directly experienced the February 6, 2023 earthquake experienced sleep quality and waking problems more than those who did not directly experience the earthquake, the difference was not significant. This situation can be explained by the fact that the earthquake took place in a very large region and even if they were not in the earthquake zone themselves, their relatives were affected or many individuals lost their lives due to the fact that it was a nationwide disaster, that is, a social trauma. As a matter of fact, individuals who are exposed to what happened in the earthquake zone through social media or mass media are more likely to experience indirect traumatic effects. In addition, the fact that the first of the major earthquakes occurred at night and occurred during sleeping hours is thought to increase the likelihood of triggering the fear of being caught in an earthquake during sleep. Because fear of earthquake may occur as a result of conditioning to stimuli such as experiencing the earthquake at home and being caught while asleep (15). Thus, individuals who do not want to sleep or who experience sleep delay may experience more intense stress, and the likelihood of decreased sleep quality or disorders increases (21). In addition, the fact that women, young people, individuals whose houses were damaged in the earthquake, who lost their loved ones and who have a history of psychiatric illness are in the risky group for sleep problems after the earthquake indicates that the earthquake has an effect on a large sample in terms of sleep problems (24). However, after the February 6 earthquakes, it may be thought that the loss of loved ones and homes of many individuals, whether in the earthquake zone or not, may have an effect on sleep problems.

Another result of the study is the relationship between fear of earthquake, sleep quality, insomnia complaints and intolerance of uncertainty. Accordingly, it is observed that fear of earthquake increases intolerance of uncertainty, insomnia complaints and poor sleep quality. This result confirms the first two hypotheses in the mediation model. In addition, it also supports the research result (37) that sleep quality of individuals who experience earthquake fear is negatively affected. Again, it was reported that a large proportion (83.20%) of the survivors had sleep problems after the earthquake, with insomnia being one of these problems (52), and that sleep problems were associated with fear of earthquake (53). Similarly, intolerance of uncertainty seems to explain the complaints of insomnia and the decrease in sleep quality. In other words, as the levels of fear of earthquake and intolerance of uncertainty increase, the likelihood of decreased sleep quality and sleep problems increases. Finally, the study concluded that intolerance of uncertainty partially mediates the relationship between fear of earthquake and insomnia complaints and sleep quality. This result confirms the last two hypotheses of the research model. It also indicates that the increase in insomnia complaints and sleep quality problems may be

related to the increase in fear of earthquake and intolerance of uncertainty. It is emphasized that intolerance of uncertainty is important in understanding the experiences of individuals after earthquakes (34) and sleep problems are thought to be related to intolerance of uncertainty (36). It is observed that individuals with shorter sleep duration after earthquake-like disasters have a higher risk of PTSD symptoms (54), and PTSD is associated with fear of earthquakes (18,20). In addition, it has been reported that intolerance of uncertainty has a strong relationship with anxiety sensitivity that may trigger fear of earthquake, which is one of the possible consequences of earthquake experience, and intolerance of uncertainty is an important risk factor for sleep problems (36). This explanation also supports the finding obtained in this study. In another study, it is emphasized that intolerance of uncertainty mediates the relationship between negative life events and sleep problems, and it is stated that intolerance of uncertainty is a concept that should be considered for intervention in sleep disorders (55). Because the intolerance of uncertainty model emphasizes that individuals use individual anxiety as a means of coping with discomfort when the outcome is uncertain (56). Considering that the earthquake process is also full of uncertainties, individuals' use of anxiety as a means of self-protection and coping may lead to sleep delays or insomnia by causing them to be constantly on guard.

As a result, the study presents a finding that is not addressed in the literature with its perspective on the role of fear of earthquake, sleep quality and insomnia complaints and intolerance of uncertainty. However, the study has some limitations. This study is a quantitative research that deals with the relationship between earthquake fear, sleep problems and intolerance of uncertainty. Qualitative or mixed design studies can be planned to address the relationship in depth. In addition, the study was conducted in a cross-sectional manner. Longitudinal studies can be planned to see long-term effects. As a result of the study, it was observed that intolerance of uncertainty had a significant effect on earthquake fear and sleep problems. Support programs that will increase the ability to tolerate uncertainty can be prepared for individuals with earthquake experience to cope with sleep problems or earthquake fear. This study did not focus on a specific developmental period as a sample. In future studies on the subject, it may be recommended to examine the experiences of special samples of children, adolescents, adults or older adults. In the context of the research results, it can be suggested that mental health professionals working with individuals with earthquake experience should evaluate earthquake fear and intolerance of uncertainty as effective factors in cases related to sleep problems of clients. In addition, preventive studies can be planned by presenting informative content on earthquake fear and intolerance of uncertainty to individuals with earthquake experience.

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Transient febrile reaction after electroconvulsive therapy in treatment resistant schizophrenia: A case report

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SUMMARY

Electroconvulsive therapy has been used safely for many years, especially in treatment resistant schizophrenia. Studies to date have identified nausea, headache, myalgia, amnesia and confusion as common side effects associated with electroconvulsive therapy. In recent years, there have been case reports of transient, benign and generally paracetamol-responsive fever following electroconvulsive therapy. This article presents in detail the fever reactions observed after electroconvulsive therapy sessions in an 18-year-old case of treatment-resistant schizophrenia. After excluding life-threatening conditions in the patient, the identified risk factors and possible underlying mechanisms, it has been concluded that transient benign febrile reactions were associated with electroconvulsive therapy.

Keywords: Electroconvulsive therapy, fever, schizophrenia, side effect

INTRODUCTION

Electroconvulsive therapy (ECT) is now widely used in the treatment of many severe psychiatric and neurological diseases, such as mood disorders, schizophrenia, catatonia, Parkinson's disease, neuroleptic malignant syndrome (NMS) etc. (1). Although the action mechanism of ECT is still not clearly known, it is a biological therapeutic method based on the principle of creating a seizure through external electrical stimulation. The procedure has been demonstrated to be fast, highly effective and safe in clinical practice for many times (2). However, some adverse effects can be observed in patients despite modern ECT applications. Nausea, headache, myalgia, anterograde amnesia and confusion are the most common side effects of ECT. Cardiac and respiratory complications are generally mild to moderate, increase with age and occur most often in patients with preexisting comorbidities (3). Fever has not formally been described as a side effect of ECT, but a few cases of transient benign febrile reactions after ECT have been reported to date (4–10). In a study in which the fever status of patients receiving ECT was evaluated retrospectively for 15 years, it was stated that approximately 8.8% of patients had fever more than once and 1.5% of ECT sessions caused fever (11). Therefore, we consider of interest the description of a patient who was recently treated in our psychiatry inpatient unit and presented with transient, recurrent and self-limited febrile reactions after ECT sessions.

Case history

An 18-year-old female patient first experienced persecutory delusions and disorganized behaviors 2 years ago. Over time, auditory and visual hallucinations were added to these symptoms. At the age of 17, after the onset of symptoms such as echolalia, grimacing, waxy flexibility, mutism and negativism, the patient was admitted to the child and adolescent psychiatry inpatient unit with a diagnosis of catatonic schizophrenia. Risperidone 4 mg/day, aripiprazole 5 mg/day, alprazolam 6 mg/day and biperiden 2 mg/day treatment was administered. During the hospitalization, catatonia symptoms completely resolved and psychotic symptoms partially regressed. The patient was discharged without completing the treatment in accordance with her family's request. She did not use her medications regularly and attend outpatient clinic checkups after discharge. Six months after hospitaliza-

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tion, her psychotic symptoms exacerbated, and she was admitted to the child and adolescent psychiatry inpatient unit for the second time. She was first administered risperidone 6 mg/day perorally, then risperidone consta 50 mg once every 2 weeks intramuscular treatment was prescribed due to treatment non-compliance. Additionally, aripiprazole 7.5 mg/day, diazepam 10 mg/day and biperiden 4 mg/day were used. Since the patient is over 18 years of age, she was transferred to the Adult Psychiatry Clinic in May 2024 to organize her treatment and follow-up. She had persecutory and reference delusions, visual and auditory hallucinations, disorganized behaviors and agitation while she was admitted to the psychiatric ward. She had no past or current history of smoking, alcohol or substance abuse. No clinical condition that would meet the criteria for catatonia was observed in the patient during her hospitalization. Routine tests performed on admission revealed leukopenia (white blood cell (WBC): 3000/μL, reference range: 4000-10000/μL) and neutropenia (absolute neutrophil count (ANC):200/μL, reference range: 2000-6000/μL) in the patient. Detailed examinations by the internal medicine department carried out no reason to explain the neutropenia. Therefore, it was initially considered that the neutropenia might be related to antipsychotic drugs. However, when past medical records were reviewed, it was observed that the patient had already been neutropenic in tests performed during periods when she was drug naive. It was decided that the patient had idiopathic neutropenia and frequent hematology follow-up was recommended. Long-acting paliperidone palmitate 150 mg intramuscular injection once monthly was started to apply due to the noncompliance with treatment. After the injections in the appropriate dose and for the sufficient duration, the patient's agitation disappeared and her disorganized behavior decreased, but her psychotic symptoms persisted. Therefore, olanzapine was added to the treatment and the dose was increased to 20 mg/day. Despite using olanzapine 20 mg/day for approximately 4 weeks, no response was obtained. The patient was considered to have treatment-resistant schizophrenia. It was decided to gradually taper off olanzapine treatment and perform ECT while continuing monthly long-acting paliperidone palmitate 150 mg intramuscular injection. Bitemporal ECT sessions were carried out by a psychiatrist and an anesthesiologist in a well-equipped set-up. Sessions were planned to be performed thrice weekly under standard anesthetic protocol using propofol as a general anesthetic agent, rocuronium as a muscle relaxant and sugammadex. The first ECT session was applied with a charge of 15 joules and led to a convulsion lasting 46 seconds. No complications were observed after the first session. The second ECT session was applied with a charge of 15 joules and led to a convulsion lasting 32 seconds. Within the first 6 hours after the second session, the patient had a fever of 39.3^{o}C. At this time the patient was physically asymptomatic and clinical examination was unremarkable. In order to investigate the etiology of fever, hemogram, routine biochemistry tests, complete urine analysis, blood-urine-stool and sputum cultures were performed. No difference was observed in the results compared to the previous results except WBC: 3100/μL ANS: 700/μL, C-reactive protein (CRP): 6.2 mg/L (refe-rence range: 0.2-5 mg/L), creatine kinase (CK): 67 U/L (reference range: 0-145 U/L). Ceftriaxone 2 g/day was started to be administered intravenously to the patient with neutropenia upon the recommendation of the infectious diseases department. A few hours after paracetamol 1000 mg was administered intravenously, the patient's body temperature returned to the normal range. Antibiotic therapy was continued for 7 days, no growth was detected in the patient's cultures and body temperature did not rise again. With the recommendation of the anesthesia department, ECT was suspended for 10 days after the antibiotic treatment. The third ECT session was applied with a charge of 20 joules and led to a convulsion lasting 25 seconds. Within the first 6 hours after the third session, the patient had a fever of 39.1^{o}C. No difference was observed except WBC: 4600/μL and ANC: 2700/μL in the laboratory explorations. No clinical symptoms were determined in the patient and the patient's fever decreased with paracetamol 500 mg tablets. Further ECT was discontinued after the third session. She was prescribed lurasidone after ECT and the dose was increased to 160 mg/day. Despite using the appropriate dose and duration of lurasidone, her psychotic symptoms persisted. In the recent period, it was planned to use clozapine and lithium treatment with close monitoring for neutropenia.

DISCUSSION

Infection, NMS, malignant catatonia and anesthe-

tic drug-associated fever could be considered as the different causes of fever observed after ECT sessions. Neutropenic fever and possible concomitant infections were ruled out in our patient. Because there was no growth in cultures, the fever resolved rapidly after a single dose of paracetamol and there were no other accompanying physical examination findings.

There are a limited number of studies showing that blood-brain barrier permeability temporarily increases after ECT applications (12). Altered permeability may increase the transition of psychotropic drugs into the central nervous system and enhance the possibility of developing NMS. Since paliperidone long-acting injection therapy was continued during ECT applications in our patient, she was evaluated for NMS. In addition, malignant catatonia was considered as a possible cause of fever due to history of catatonia in the past. It is noteworthy that most of the cases of ECT related febrile reactions reported in the literature have catatonic features (5,7,8,10). However, no other clinical or biochemical changes required for both NMS and malignant catatonia diagnosis were detected in the patient except fever. ECT is also indicated in the treatment of NMS and malignant catatonia.

Possible febrile complications associated with the use of propofol were reviewed. Propofol infusion syndrome (PRIS) is a rare clinical condition with serious mortality and usually seen in children. In addition to hyperthermia, the main presenting signs of PRIS include rhabdomyolysis, cardiac arrhythmia, metabolic acidosis, hypotension, hyperkalemia, elevated liver enzymes and renal failure (13). PRIS is considered to be caused by the effect of propofol inhibiting mitochondrial fatty acid metabolism (14). It usually occurs when used for more than 48 hours as an infusion or at a dose greater than 4 mg/kg/hour (13). Another cause of propofol associated fever is susceptibility of propofol to environmental microbiological contamination due to its lipid-based structure (14). A new ampoule of propofol was opened immediately before ECT and a single dose of propofol was administered in a sterile manner to our patient just before the procedure. No febrile reaction was observed in other patients who received propofol and underwent ECT on the same days. Therefore, propofol-related fever was ruled out in our patient.

In a retrospective study evaluating ECT-related fever, female gender, young age, long seizure duration, thyroid diseases and low-dose quetiapine use were found to be associated with febrile reactions after ECT (11). Our patient is also a young woman and although she did not have a symptomatic or diagnosed thyroid disease, thyroid peroxidase (TPO) autoantibodies were detected positive. After she was scheduled to receive ECT, paliperidone long-acting injections were continued in her treatment and low doses of quetiapine were used intermittently for agitation or sleep problems. All these clinical features may have been predisposing factors for fever after ECT.

The causes of fever as a side effect of ECT are still not clearly known. However, it is suggested that mechanisms such as activation of the autonomic nervous system, disruption of thermoregulation due to the effect of ECT on the hypothalamus and triggering of the immune response may play a role in the etiopathogenesis of ECT associated fever (5,7–10). Autonomic system activity presents triphasic variation as parasympathetic-sympathetic-parasympathetic after exposure to electrical stimuli during ECT (15,16). The initial parasympathetic discharge lasts for 10-15 seconds and is immediately followed by sympathetic response of 5-7 minutes (5). Increased sympathetic activity can raise body temperature. However, in our case, the duration of the fever was much longer than the duration of sympathetic activity. Therefore, fever does not appear to be directly linked to increased transient sympathetic tone. Current research results suggest that ECT has a demonstrable impact on the structure and function of the brain (17). The principle thermoregulation center is located in the pre-optic hypothalamic region. It is stated that fever can be observed in the post-ictal period of partial and generalized seizures. It is also conceivable that the excessive neuronal activity of the seizure could transiently disrupt the function of the thermoregulatory control center in the anterior hypothalamus (18,19). It has been observed that even a single session of ECT temporarily triggers but repeated ECT applications suppress the immune response (20). Interleukin-1 (IL-1), interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α) and interferon-γ (IFN-γ) are the most potent

endogenous mediators of fever (21). Higher WBC counts were reported in patients with fever after ECT compared to the control group without fever (11). Leukocytosis is accepted as a peripheral marker of the immune reaction. In our patient with idiopathic neutropenia, the transient increase in WBC and ANC after febrile ECT sessions may be a sign of a triggered immune response. In the light of all these findings, the cause of the patient's fever was primarily thought to be a benign febrile reaction related to ECT.

In our case report, we attempted to elucidate the causes of fever, which is one of the uncommon adverse effects of ECT. Before cases are accepted as benign febrile reactions related to ECT, other life-threatening etiologies must be excluded. Considering the increasing number of case reports in recent years, there is a need for clinical studies evaluating potential risk factors and possible mechanisms for ECT-associated transient fever. The results of these studies will guide whether ECT should be continued or discontinued.

Informed consent: Written informed consent was obtained from the patient and her parents to publish this manuscript.

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Two-injection start regimen of long-acting aripiprazole in three patients treated with bipolar affective disorder manic episodes: Review with case reports

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SUMMARY

Long-acting aripiprazole is used in the acute treatment of bipolar affective disorder (BAD) and schizophrenia as well as in maintenance treatment. There are few data on the use of long-acting aripiprazole initial double dose in BAD. Factors such as frequent hospitalizations, recurrent attacks, aggression, comorbid substance use, lack of insight, and poor medication compliance are influental in the choice of long-acting antipsychotics. Aripiprazole initial double dose may be a safe and effective option in patients with BAD. In this study, we will present 3 cases who were involuntarily hospitalized with BAD manic episode and treated with long-acting aripiprazole two-injection start regimen and review the literature on this subject.

Key words: Aripiprazole, bipolar affective disorder, long-acting injection, mania

INTRODUCTION

Aripiprazole is a third-generation antipsychotic with antagonist activity at serotonin 5-HT2A receptors and partial agonist activity at dopamine D2 and serotonin 5-HT1A receptors (1). The aripiprazole long-acting injection (LAI) has been approved by the European Medicines Agency (EMA) for the treatment of schizophrenia and manic episodes associated with bipolar affective disorder (BAD) in adults at a dose of 400 mg once a month (2). Aripiprazole is the first D2 receptor partial agonist with a long-acting form for the maintenance treatment of schizophrenia and BAD (3). In the initial administration of aripiprazole with a once monthly injection, it is recommended to take 10-20 mg oral aripiprazole concomitantly with the injection for 14 days to maintain therapeutic aripiprazole concentrations (4). The EMA recently approved an initial strategy of oral 20 mg aripiprazole followed by two-injection start (TIS) regimen aripiprazole LAI at separate gluteal and/or deltoid injection sites on the same day (5). With this simplified strategy, aripiprazole has been shown to reach therapeutic plasma concentrations on the first day of treatment, support consistent clinical efficacy throughout the dosing interval, have a safe and tolerable profile, and eliminate the need for 14-day oral tablet supplementation (5). This new starting option is thought to prevent compliance problems that may occur during treatment in patients (5). It has been shown that the aripiprazole LAI is more effective than the LAI forms of haloperidol and risperidone in patients with schizophrenia and BAD, delays the relapse period, and reduces relapse rates and hospitalizations (6). In patients who experience relapses related to treatment compliance or who have an inadequate response to treatment, it is thought that starting treatment with the aripiprazole TIS regimen will reduce relapses that may occur at the beginning of treatment, the length of hospital stay, and the burden of caregivers to control oral ari-piprazole intake (5). In a study conducted in Italy with 133 schizophrenia patients, it was found that the aripiprazole TIS regimen did not cause serious side effects in patients, was tolerable and safe, and the side effects were similar to those observed with a single injection (7). In a study conducted in Spain with schizophrenia patients, it was shown that patients were hospitalized largely due to non-compliance with treatment, and that the aripiprazole TIS regimen shortened the average

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length of stay and reduced the use of concomitant medications (8). In a systematic review of the use of LAI antipsychotics in BAD, second-generation LAI antipsychotics were shown to be effective in treating manic symptoms and preventing the recurrence of mood attacks (9). In the same study, multicenter randomized controlled studies using the same sample produced by Calabrese et al. on the use of aripiprazole LAI in BAD were mentioned in the literature (9). Calabrese et al. found that aripiprazole LAI therapy was safe and tolerable in the treatment of BAD maintenance period (10). In addition to limited information on the use of aripiprazole LAI in BAD, there is a single case report on the aripiprazole TIS regimen (11). In this case report, three patients with BAD who were treated with the aripiprazole regimen will be presented and the literature on this subject will be reviewed. The case report statement, checklist and guidelines were followed in the preparation of the case report (12).

Case presentations

Case 1: A 44-year-old male patient was admitted to the psychiatric ward with a decision for compulsory medical treatment, following his family's application. He presented with symptoms such as restlessness, insomnia, irritability, delusions of being a prophet, touchiness, taking out large amounts of credit, spending money, and unruliness. Diagnosed with BAD with a manic episode at the age of 39, the patient had received inpatient treatment only for his first episode in his five-year illness history. The patient also had diagnoses of cannabis use disorder and obesity accompanying BAD. Substance analysis performed on the day of hospitalization revealed positive cannabis. On the first day of hospitalization, the patient experienced psychomotor agitation and was administered benzodiazepine and intramuscular haloperidol. On the second day of hospitalization, valproate and 20 mg oral aripiprazole were initiated, and the aripiprazole TIS regimen was applied to two different gluteal regions on the same day. During follow-up, the patient exhibited a good safety and tolerability profile, with no akathisia or metabolic side effects observed. Throughout his stay in the ward, he demonstrated clinically increased insight, decreased irritability and exuberance, decreased substance cravings, and an overall improvement in functioning. The level of improvement was observed in the clinical scale scores. On the 32nd day of treatment, the patient was discharged with a LAI maintenance dose.

Case 2: A 42-year-old female patient presented with symptoms including euphoria, insomnia, restlessness, the initiation of numerous new projects, and rapid, pressured speech. Following a family application, she was admitted to the psychiatric ward under a compulsory medical treatment order. Her 12-year history revealed four depressive and two manic episodes. It was noted that these episodes typically occurred within three months of discontinuing her prescribed medications, resulting in three hospitalizations. She had no history of comorbid medical conditions. Her treatment history included various typical and atypical antipsychotics and mood stabilizers, but she had not previously received LAI antipsychotic treatment. Treatment was initiated with oral lithium 600 mg and aripiprazole 20 mg, and the aripiprazole regimen was administered via two separate deltoid injections. No significant adverse effects were observed during follow-up. During treatment, a reduction in psychomotor agitation and an increase in sleep duration were noted. A maintenance dose of aripiprazole LAI was administered within the first month of treatment. The patient, who demonstrated improved insight into her condition and enhanced functionality, was discharged on the 34th day of treatment.

Case 3: A 47-year-old female patient was admitted to the psychiatric ward under a compulsory medical treatment order following judicial proceedings. She presented with symptoms including increased libido and pressured speech, insomnia, excessive wandering, heightened energy, and extreme irritability. Her 17-year history included five manic and three depressive episodes, with six total hospitalizations, all of which were involuntary and preceded by medication discontinuation. Her past medical history revealed the use of various combinations of typical and atypical antipsychotics and mood stabilizers, such as haloperidol, zuclopenthixol, risperidone, olanzapine, and quetiapine. She had previously undergone dialysis for lithium intoxication. She had received all available

Table 1.

		Initation day of TIS regimen	1 week later	2 week later	3 week later	4 week later
Case 1	YMRS	31	22	13	10	5
	PANSS	72	52	43	35	33
	CGI-S	10	8	6	5	3
	BARS	2	1	0	0	0
	SAS	2	1	1	1	1
Case 2	YMRS	30	21	12	7	3
	PANSS	56	44	37	34	31
	CGI-S	10	9	6	4	2
	BARS	0	0	0	0	0
	SAS	1	1	1	0	0
Case 3	YMRS	33	17	8	4	2
	PANSS	78	58	40	32	30
	CGI-S	12	8	3	3	2
	BARS	3	1	0	0	0
	SAS	0	0	0	0	0

YMRS:Young mania rating scale, PANSS:Positive and negative syndrome scale, CGI:Clinical global impressions, BARS:Barnes akathisia scale, SAS:Simpson-angus scale

LAI treatments except aripiprazole LAI. Oral aripiprazole 20 mg, quetiapine 200 mg, and lorazepam 2 mg were initiated. On the same day, the aripiprazole TIS regimen was administered via bilateral gluteal injections. No adverse effects were observed during follow-up. The patient's sleep and libido normalized, her speech became less pressured, and her daily functioning improved. Sleep and restlessness symptoms subsided, and quetiapine and lorazepam were gradually tapered and discontinued after the second week of treatment. The Young Mania Rating Scale score, which was 33 at baseline, decreased to 8 by the second week. A maintenance dose of aripiprazole LAI was administered within the first month. The patient was discharged in remission on the 32nd day of treatment.

Patients' clinical symptoms were evaluated during hospitalization and follow-up using the Young Mania Rating Scale (YMRS), Clinical Global Impressions (CGI), and Positive and Negative Symptom Scale (PANSS) (13-15). The safety profile was assessed using the Barnes Akathisia Rating Scale (BARS) and the Simpson-Angus Scale (SAS) (16, 17). The YMRS measures the severity of manic states, with scores ranging from 0 to 60. The PANSS evaluates psychotic symptoms and patient functionality over the past week, with scores ranging from 30 to 210. The CGI is a three-dimensional scale designed to allow clinicians to record their impressions of patient functionality before and after treatment initiation. The scale's first dimension assesses disease severity, the second evaluates recovery, and the third assesses drug side effect severity. In this study, the first two dimensions, CGI-S, were used. The BARS assesses akathisia resulting from antipsychotic use, with scores ranging from 0 to 13. The SAS aims to identify extrapyramidal symptoms resulting from antipsychotic use, with scores ranging from 0 to 40. The scores from the scales administered before and during the four-week clinical follow-up prior to the aripiprazole TIS regimen are presented in Table 1.

DISCUSSION

As with many chronic diseases characterized by intermittent symptoms, medication non-adherence is frequently observed in BAD (18). One study found that 34% of patients diagnosed with BAD did not take at least one psychotropic medication within a 10-day period, and 20% missed all daily doses at least once (19). Another study demonstrated that nearly 49.5% of 1,052 BAD patients were non-adherent to treatment, and this high rate of medication non-adherence was associated with poorer treatment response and impaired functioning (20). In BAD, treatment adherence increases the duration of remission, while a decline in adherence shortens the interval between episodes and increases relapse rates (21). LAI antipsychotic treatment has been shown to significantly improve quality of life, functionality, disease prognosis, and reduce relapse rates in chronic mental illnesses compared to oral formulations (22, 23). A study conducted in Turkey showed that the use of LAI antipsychotics in BAD reduced the number of hospital days and hospitalizations (24). A randomized, double-blind study revealed that monthly aripiprazole LAI was effective in the maintenance treatment of BAD, significantly reducing overall symptoms and mania severity, with effects maintained

for one year (25). In BAD, Aripiprazole LAI treatment has been shown to reduce the proportion of individuals experiencing mood episodes, prolong the time to episode recurrence, and improve treatment adherence compared to placebo (26).

In a study conducted in China among patients with BAD, the prevalence of involuntary hospitalization was found to be 52%, with a strong correlation observed between manic episodes, aggression, low education level, poor insight, and involuntary treatment (27). Another study found that BAD patients receiving involuntary treatment exhibited lower treatment adherence, higher rates of comorbid substance use disorders, reduced insight, and increased aggressive behavior compared to those receiving voluntary treatment (28). It has been demonstrated that the use of LAI antipsychotics reduces hospitalizations by 45.2% compared to the pre-transition period when compared to oral antipsychotics, and also decreases the frequency of involuntary hospitalizations (29). A systematic review examining the effects of LAI antipsychotics in BAD and schizoaffective disorder concluded that aripiprazole LAI significantly delayed manic episode recurrence in BAD without triggering depression, while also demonstrating that all LAI antipsychotics were effective against mania, but first-generation antipsychotics worsened depressive symptoms (30). Second-generation LAI antipsychotics have been shown to improve treatment and patient adherence, enhance general functioning, and reduce the risk of relapse, psychiatric emergencies, and the rate and duration of rehospitalization compared to first-generation antipsychotics (31). Treatment adherence is a critical determinant of hospitalization status in BAD, with atypical antipsychotics demonstrating superiority over typical antipsychotics in terms of both voluntary and involuntary hospitalization status and treatment adherence (32).

The most commonly used medications in BAD include mood stabilizers, anticonvulsants, and second-generation atypical antipsychotics (33). Among second-generation antipsychotics, LAI forms of risperidone and aripiprazole are approved for the maintenance treatment of BAD (34). Studies have shown that weight gain and metabolic side effects are more prevalent during risperidone LAI monotherapy compared to placebo in patients with BAD (35). A study assessing the tolerability and safety of oral aripiprazole and aripiprazole LAI for the treatment of manic episodes and maintenance of BAD concluded that these medications exhibit a favorable tolerability profile, with reduced risks of weight gain, dyslipidemia, diabetes, and hyperprolactinemia, a lower propensity for extrapyramidal side effects than first-generation antipsychotics, and robust cardiovascular safety (36). In BAD, aripiprazole LAI monotherapy has been associated with a prolactin-sparing profile, minimal sexual dysfunction, and a favorable metabolic side effect profile, with transient and infrequent side effects leading to high patient satisfaction and reduced medication discontinuation rates (37). A prospective study demonstrated that after 6 months of aripiprazole treatment, patients' metabolic profiles remained unaffected, prolactin levels normalized, and the dosages of other antipsychotics in combination therapy could be decreased (38).

Aripiprazole has demonstrated effectiveness in treating acute mania symptoms in BAD when used as monotherapy or in combination with mood stabilizers (39). The addition of aripiprazole to lithium or valproate has been shown to rapidly improve mania symptoms within 1–2 weeks of treatment initiation, and this combination therapy is well-tolerated (40). In a randomized controlled trial involving patients with limited response to lithium and valproate monotherapy, adding aripiprazole to the treatment regimen resulted in improved patient symptoms and an increased time to any mood episode over a 1-year period (41). Aripiprazole LAI has been shown to reduce manic episode symptoms in BAD, prevent relapses, enhance quality of life and functionality, and exhibit a safe and tolerable profile (42).

The aripiprazole TIS regimen has recently become available (5). Two studies in the literature have examined its application in a schizophrenia patient group (7, 8). Patient non-compliance with treatment was identified as the primary reason clinicians chose this alternative regimen, with patients reporting high satisfaction, and psychiatrists stating that this practice reduces average hospitalization costs by enhancing treatment adherence and con-

serving healthcare resources (8). The successful treatment of a 16-year-old BAD patient with the aripiprazole TIS regimen, beyond its use in schizophrenia, demonstrated its favorable safety and efficacy profile. The case report further highlights the potential for this regimen to offer advantages in reducing treatment non-adherence and relapse in first-episode BAD patients. (15). However, when examining studies on aripiprazole LAI treatment in BAD, it is evident that many were conducted in multicenter settings and utilized data from the same sample, which limits the breadth of available information in this field (42).

In our study, three patients were admitted to the treatment clinic via involuntary hospitalization. One patient had a comorbid substance use disorder diagnosis. Another patient had a history of oral antipsychotic use only. No serious side effects that negatively impacted treatment were observed in two patients receiving aripiprazole with a mood stabilizer. Two patients received a combination of a mood stabilizer and aripiprazole LAI, while the third patient received aripiprazole LAI monotherapy. All three patients hospitalized with BAD manic episodes responded favorably to aripiprazole treatment. Our study demonstrates that the aripiprazole TIS regimen is a useful and effective treatment with a favorable safety and tolerability profile. This was observed in three patients with BAD manic episodes who exhibited low treatment adherence, required inpatient treatment, had comorbid substance use disorders, experienced frequent hospitalizations, and necessitated combination therapy. Further randomized controlled trials comparing the aripiprazole TIS regimen with single-dose initial administration in terms of efficacy, safety, and tolerability in clinical practice for patients with BAD will help elucidate the effect of this strategy in patients who are non-adherent to treatment, have additional diagnoses, are involuntarily admitted, and require combination therapy.

Informed consent: Written informed consent was obtained from the patients and her parents to publish this manuscript.

Conflict of interest: No financial support was received for the study and there is no conflict of interest among the authors.

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Dizziness associated with sertraline treatment in a 12-year-old male with generalized anxiety disorder and panic disorder

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Dear Editor,

Anxiety disorders are seen extremely frequently in children and adolescents (1). A meta-analysis reported the prevalence of anxiety disorder as 6.5% in children and adolescents (2). In the treatment of anxiety disorders, selective serotonin re-uptake inhibitors (SSRI) are used as a safe and effective treatment method with tolerable side-effects (3). Moreover, there is also some data in the literature that there has been a reduction in dizziness with the use of SSRIs. Conversely, patients may rarely experience intolerable side effects (4,5). The case of a 12-year-old male patient is presented, describing the onset of severe dizziness with sertraline use, along with a discussion of the treatment process in the context of relevant literature.

A 12-year-old male presented together with his parents at our outpatient clinic with the complaints of heart palpitations, nausea, boredom, and continuous anxiety, all of which made him not want to go to school. The patient stated that for about a year he had the feeling almost every day that something bad was going to happen. He felt restless, had other complaints of internal discomfort, had difficulty falling asleep, and found it difficult to concentrate in class. Over the past month, the patient has experienced sudden attacks of intense anxiety, with a feeling of being unable to breathe, a rapid heartbeat, numb and trembling hands, abdominal pain and a feeling of dying. He was afraid of having another attack and facing situations such as the feeling of not being able to breathe or the sensation of dying, which made him extremely anxious.

The patient was urgently referred to the Pediatric Cardiology Department because of these complaints. The results of electrocardiography (ECG) and echocardiography (ECHO) examinations were normal. The patient had no previous psychiatry presentation, and had never used any psychiatric drugs. When the family psychiatric history was questioned, it was learned that the mother had previously been diagnosed with generalized anxiety disorder (GAD) and had a history of medical treatment for that. After a psychiatric evaluation using the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL) (6), a widely used semistructured diagnostic interview for examining current and lifetime psychopathology in children and adolescents, the patient was diagnosed with GAD and panic disorder (PD) (respectively, Clinical Global Impressions (CGI)-Severity subscale=5; CGI-Severity subscale=5). Treatment of 25 mg/day sertraline was started for GAD and PD. On the third day of sertraline treatment, the patient was admitted to the emergency department due to severe dizziness. According to the information obtained from the patient and his family, severe dizziness started within 24 hours after the use of psychopharmacological drug (CGI- Efficacy index =0.5). The Naranjo scale was used to assess the patient's symptoms (7), and the patient scored 4 points on the scale, which was considered a possible adverse drug reaction. Due to the complaints of dizziness, Pediatric Neurology and Pediatric Cardiology were consulted. Examinations with electroencephalography (EEG), ECG, ECHO, an brain magnetic resonance imaging (MRI) were

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reported as normal. The patient was also evaluated by an otolaryngologist for dizziness complaints, and the examination was reported as normal. In the patient's laboratory test results, complete blood count (CBC), blood biochemistry, thyroid function tests, and vitamin B12 levels were evaluated as normal. Arterial blood pressure was measured as 110/60 mm Hg.

The medical treatment of the patient was changed to 5 mg/day fluoxetine, which has a longer half-life than sertraline. At the follow-up examination after 3 weeks, there was seen to be no change in the complaints in respect of anxiety disorder, but the complaints of dizziness had completely recovered (CGI- Efficacy index =1). As the GAD and PD complaints were still ongoing, the fluoxetine treatment was increased to a dose of 10 mg/day. After a further 3 weeks, the GAD and PD complaints had receded, but anxiety continued to have a negative effect on the functionality of the patient, so the fluoxetine was increased to 20 mg/day. During the subsequent follow up of the patient, the GAD and PD symptoms significantly decreased (respectively, CGI- severity subscale=2; CGI-severity subscale=1) and there were no complaints of dizziness after starting the fluoxetine treatment. Verbal and written consent was obtained from the patient and her family to publish this case report.

In this case report, a patient diagnosed with GAD and PD, who had no previous complaints of dizziness, experienced severe dizziness with the initiation of sertraline treatment, then these complaints were seen to recover when the treatment was changed to fluoxetine.

Sertraline is among the most selective (as opposed to noradrenaline) and effective SSRIs in inhibiting serotonin reuptake. Since the vestibular nucleus complex (VNC) has abundant serotonin receptors, it has been suggested that changes in serotonin may have a significant effect on the electrophysiological activity of neurons, and that changes in serotonin in the VNC would impair the function of its neurons, causing dizziness (8). It has also been reported that the half-life of sertraline is 15-26 hours, whereas the half-life of fluoxetine is 4-6 days, and norfluoxetine, which is an active metabolite, has a half-life of 4-16 days (9). In the light of these data, it was thought that the dizziness in our patient who used sertraline treatment may have been caused by the sudden change in serotonin levels in the vestibular nucleus complex caused by sertraline, which has a shorter half-life than fluoxetine.

In another aspect, studies have reported that fluoxetine may increase noradrenaline (10,11). In addition to this, it has been suggested that noradrenaline may regulate the intensity of central responses to vestibular stimulation and that adrenergic drugs may have a prophylactic effect against motion sickness (12). In light of this information, the improvement in our patient's dizziness may be attributed to fluoxetine, which, unlike sertraline, regulates vestibular stimulation by increasing noradrenaline.

In conclusion, the adverse effect of dizziness resolved after discontinuation of sertraline and did not recur after initiation and upwards titration of fluoxetine. In addition, considering that dizziness was not among the patient's initial complaints and its relationship with changes in the medical treatment, it was concluded that the patient's dizziness was not caused by an existing psychiatric diagnosis. We suggest that the dizziness in this patient may have improved due to sertraline's shorter half-life compared to fluoxetine or due to the regulation of vestibular stimulation from increased noradrenaline levels associated with fluoxetine. Clinicians should be aware of this adverse effect when starting sertraline in patients. Therefore, further studies on the possible association of dizziness with sertraline and fluoxetine are needed.

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Fundamentals of behavioral neuroscience and experimental research techniques

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Book Title: "Fundamentals of behavioral neuroscience and experimental research techniques"

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The author is currently the advisor to the rector, head of the Department of Internal Medicine at the Faculty of Medicine and director of the Neuropsychopharmacology Application and Research Center at Üsküdar University.

The book begins with a preface including a brief history. In the preface, it is stated that Hippocrates, who lived in Antiquity, emphasized that the source of emotions was the brain in his work Sacred Disease, Arateus, who lived in Cappadocia, defined the symptoms of mania, depression and schizophrenia as abnormal behavioral patterns, and Ibn-i Sina mentioned experimental psychology in the early 9th century. Descartes recognized the connection of abstract behaviors with the brain. The first observations of experimental medicine date back to the early 20th century. The Italian pathologist Camillo Golgi discovered the intracellular structure that bears his name. The discovery of neurons and their communication with each other formed the basis for the study of behavioral neuroscience. Diseases such as stroke, autism, schizophrenia, substance abuse and Alzheimer's disease cause serious workforce losses and increase the burden of these diseases on society. This has led to an accelerating interest in neuroscience. Research has reached and surpassed the molecular genetics stage.

Apart from this introduction, the book consists of two main sections, an introduction, 21 sub-chapters, references and an index. The first main part is entitled Foundations of Behavioral Neuroscience and consists of seven sub-chapters.

The introduction lists the disciplines to which behavioral neuroscience is related and discusses the behavioral implications of these connections.

The first chapter of the first main section deals with the microscopic structure of the nervous system. In this section, the microscopy of the neuron, its extensions and their structures, cell membrane and ion channels, types of neurons according to differences in function, types of neurons according to differences in appearance and structure, and the structure and functions of glial cells are described. In addition, the blood-brain barrier, which regulates the passage of blood to the central nervous system and protects the brain from external factors, is covered in detail and the information is supported by schematic illustrations.

The second chapter is titled Nervous System and deals with the peripheral and central nervous system separately. The peripheral nervous system is divided into somatic and autonomic systems and basic information about the functions of these structures is presented. Under the title of central nervous system, the anatomical structures and connections of the brain are explained.

The third chapter is titled Inter-neuronal Transmission in the Nervous System. In this chapter, the structures that mediate the transmission of information between neurons, the concepts of post-synaptic excitation and inhibition, receptors and their subtypes, and the classification and functions

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of chemical transmitters are discussed.

In the fourth chapter, the structure, connections and functions of chemotransmitter systems are examined. In this context, noradrenaline and noradrenergic system, dopaminergic system, serotonergic system, cholinergic system and polyamines are discussed in detail. Polyamines are given special importance in the book. The main reason for this is that agmatine was identified by the author as a separate pathway in schizophrenia apart from the dopamine system. This is a new avenue for developing new drugs. The chapter discusses their synthesis and metabolism pathways as well as their role in neuropsychiatric disorders and states that agmatine has modeled schizophrenia in experimental studies. The chapter continues with the GABAergic system, purinergic system, adenosinergic system and peptidergic systems.

The fifth chapter focuses on brain development, explaining how developmental processes develop and what kind of problems can be encountered.

The sixth chapter is titled Neuroplasticity. The concept of neuroplasticity describes the ability of the nervous system to change its structure and function by learning from experience. The chapter includes the systems involved in these processes, learning processes and their functions.

The seventh chapter is titled Brain Reward System. This chapter highlights the importance of pleasure and reward in mammalian behavior and describes in detail the discovery, history, anatomy and role of dopamine in this system.

The second main part of the book is devoted to experimental techniques and animal models used in behavioral neuroscience research. After a brief introduction, the chapter continues with a general information section. In this chapter, ethical principles to be followed in research, laboratory infrastructure and infrastructure of experimental animals and breeding of animals, general rules of studies, classification of animal models and new drug development are explained.

In the following chapters, motor activity and motor coordination tests, tests for learning and memory measurement, experimental models for Alzheimer's disease; studies on anxiety, pain and pain mechanisms, experimental models for Parkinson's disease, substance abuse, attention deficit hyperactivity disorder and autism spectrum disorder, optogenetics and intestinal microbiota studies are included and the book is completed with references and index.

I congratulate the author for bringing such a book into our language.

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