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ARTICLE

Relationship between Obsessive-Compulsive Symptoms and Anxiety Levels during the COVID-19 Pandemic in Healthcare Professionals *vs.* Non-Healthcare Professionals

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ABSTRACT

The present study investigated the effect of the COVID-19 pandemic on anxiety levels, contamination and responsibility/control obsessions and associated OC behaviors in healthcare *versus* non-healthcare professionals. The study also aimed to examine the relationship between anxiety levels and obsessive-compulsive (OC) symptom levels, gender, age, educational level, and personal and family history of chronic diseases. The 664 participants included 395 (59.5%) men and 269 (40.5%) women and comprised 180 (27.1%) healthcare professionals and 484 (72.9%) non-healthcare professionals. The survey included three data collection tools: (i) Sociodemographic data form, (ii) Beck Anxiety Inventory (BAI), and (iii) the Dimensional Obsessive-Compulsive Scale Abriged (DOCS-A) pre- and post-pandemic forms. The BAI scores established a moderate positive correlation with post-pandemic DOCS-A total scores and a weak positive correlation with pre-pandemic DOCS-A total scores ($p < 0.001$ for both). Pre- and post-pandemic DOCS-A total and subdimension scores were significantly higher in women than in men ($p < 0.05$). Participants with a personal history of chronic diseases had higher BAI and DOCS-A scores compared to participants with no such history ($p < 0.001$ and $p < 0.001$, respectively). The results indicated a significant increase in OC symptoms during the pandemic period compared to the pre-pandemic period and a moderate correlation between the anxiety levels and OC symptom severity. It was also revealed that female gender and personal or family history of chronic diseases posed a higher risk for the increase in anxiety and OC symptoms and healthcare professionals had a higher risk of developing anxiety symptoms compared to non-healthcare professionals.

KEYWORDS

Pandemic; healthcare professionals; non-healthcare professionals; obsessive behavior

1 Introduction

Coronavirus disease 2019 (COVID-19) emerged in Wuhan, China in December 2019 and spread to the whole world in a short period of time. The outbreak was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 [1]. On the same day, the first case of COVID-19 was reported in our country, and subsequently, various measures were imposed to slow down the transmission rate of this highly contagious disease, and the pandemic received a wide media coverage around the world. In addition to causing a global health crisis, the pandemic had a significant psychosocial impact on the societies. Additionally, the psychosocial burden during the pandemic was further increased by quarantine conditions, social isolation, limited access to basic needs, financial losses, information pollution in both social and mass media particularly during the early stages of the pandemic, reduced interpersonal interactions, challenges in close relationships, and increased risk perception. On the other hand, the strict quarantine measures and travel bans imposed nationally and internationally and the subordination of non-pandemic healthcare services in healthcare facilities ceased regular treatment and counseling services and also led to difficulties in accessing psychiatric medication [2]. In turn, these factors increased the risk of exacerbation and worsening of existing diseases in patients receiving psychiatric treatment as well as the risk of developing psychiatric diseases in patients with no history of such diseases. Additionally, it was also reported that the deterioration in interpersonal relationships and the impact of isolation and social distancing have resulted in "medical insecurity", thereby causing an increase in the incidence of paranoia and depression symptoms [3]. In previous pandemics, lockdown measures were reported to have various mental effects including irritability, fear of contracting the disease and infecting other family members, anger, loneliness, denial, anxiety, depression, insomnia, despair, disappointment, and suicide attempt [4,5]. Disorders such as post-traumatic stress disorder (PTSD) were also reported and were positively associated with the quarantine period [6]. Additionally, the treatments received by infected patients during the pandemic along with their increased stress levels, stigmatization, and decreased self-care were reported to predispose them to suicidal tendency [3]. In pandemics, individuals with psychiatric diseases may have an increased risk of infection in the presence of poor cognitive functions, low level of awareness, impaired risk perception, and low concerns about personal hygiene [7]. In addition, stigmatization against patients with mental disorders may further complicate the condition of these patients [8].

Individuals with low concerns about pandemics show less reaction to the pandemic. It can be thought that individuals who are not healthcare professionals, who are young, who do not have a chronic disease, and who do not have a family history of chronic diseases may worry less, have lower anxiety levels, and exhibit lower obsessive symptoms. They may pay less attention to hygiene measures and social distancing and are less likely to be vaccinated even if a vaccine is found [9]. In contrast, individuals with high concerns about infectious diseases exhibit different behaviors. To illustrate, they may misinterpret mild or clinically insignificant symptoms as serious signs of infection and may seek reassurance by making repeated unnecessary visits to healthcare facilities. They may also exhibit maladaptive behaviors, do panic-buying, spend more time and energy on cleaning, completely isolate themselves from other people, and exhibit overcautious behavior. Moreover, some people may avoid seeking medical help, considering healthcare facilities as sources of transmission [8]. Cases with suspected COVID-19 may be anxious due to uncertainty about their health status and may develop obsessive-compulsive (OC) behaviors such as repeated temperature measurement and sterilization [10]. Excessive cleaning and avoidance are common symptoms of obsessive-compulsive disorder (OCD). These symptoms are known to occur in the context of everyday anxieties and problems and to recur in case of stress caused by external or environmental factors [11,12]. As such, the disaster scenario of an OCD patient, whose greatest fear is "being infected", becomes a reality during the pandemic period. For this reason, OCD patients often measure their temperature, misinterpret a sore throat or headache as a serious COVID-19 symptom, and rush to

healthcare facilities to check on their condition. In an attempt to prevent infection, they may wash their hands excessively, shower frequently, and spend more energy and time to ensure complete hygiene. Individuals with high anxiety levels such as OCD patients and individuals with generalized anxiety disorders and somatization disorders may also misinterpret mild physical symptoms and sensations as signs of serious diseases [8]. Additionally, they may misinterpret a mild muscle pain or an ordinary symptom of cough as symptoms of COVID-19 and their distress may increase remarkably due to their concerns and anxiety about contracting COVID-19, which in turn may affect their behavior and decision-making mechanisms and thereby may cause them to visit healthcare facilities unnecessarily and increase the burden of those facilities [8].

Given these conditions, healthcare professionals have a special place in the fight against the pandemic. These professionals are both members of the general society and have the same psychosocial burden as other people and also face additional risks due to their professions and working conditions while the majority of people in the society perform self-isolation and social distancing. In pandemics, healthcare professionals continue to work actively with the infected patients and carriers and their workloads are increased remarkably even when the recommended measures are followed, and they face all the negative aspects of the infection and death including the death of their colleagues. All these factors subject them to serious stress, causing them to worry about the patients they care for as well as for themselves and their families. Accordingly, during the pandemic period, healthcare professionals are at a high risk for developing mental health changes, excessive anxiety, inappropriate and overcautious behavior, and OC symptoms. Previous studies reporting on previous influenza pandemics reported that more than half of the healthcare professionals experienced moderate-to-severe anxiety and the healthcare professionals at a higher risk of infection had higher anxiety levels. The studies also noted that during the Severe Acute Respiratory Syndrome (SARS) pandemic, healthcare professionals had somatic and cognitive anxiety symptoms in addition to depression and avoidance and that the symptoms were detected in up to 75% of the individuals [13–15].

There have been reports that the mental health of healthcare workers has been affected in the COVID-19 pandemic. Health care workers have reported anxiety, depression, sleep problems, and distress during the COVID-19 pandemic [16]. Some studies have identified several factors related with mental health outcomes in health care workers: limited resources in healthcare settings, threat of exposure to the virus, longer work durations, disruption in sleep patterns, change in work–life balance, subsequent heightened dilemmas regarding patient duties *versus* fear of exposure to family members, neglect of personal and family needs with increased workload, and lack of sufficient communication and updated information. These have been reported as main factors contributing to increased physical and mental fatigue, burn out, stress and anxiety [17].

Identifying and addressing the high level of anxiety, OC symptoms, and related behaviors during a global pandemic in individuals with or without prior psychiatric diseases is highly important for providing them psychological counseling, establishing their treatment plans, and managing the adverse effects of their behavior changes on healthcare facilities.

From the notions mentioned above, it is clear that people are greatly concerned by the COVID-19 pandemic, mainly because it is a stress factor seriously affecting their lifestyles and economic status in our country and in the whole the world and can lead to serious health problems and death. Accordingly, we consider that the anxiety caused by the COVID-19 pandemic is associated with the increased OC symptoms and that healthcare professionals are particularly affected by this pandemic.

The present study investigated the effect of the COVID-19 pandemic on anxiety levels, contamination and responsibility/control obsessions and associated OC behaviors in healthcare *vs.* non-healthcare professionals. The study also aimed to examine the relationship between anxiety levels and OC symptom

levels, gender, age, educational level, profession (healthcare professional *vs*. non-healthcare professional), and personal and family history of chronic diseases.

2 Materials and Methods

The study was designed as a survey study, which included all the public employees residing in Van Province, Turkey. The online survey was administered between August 15 and December 15, 2020. The surveys were sent to healthcare professionals (doctor, dentist, nurse, midwife, pharmacist, secretary and other allied health professions) and non-healthcare professionals (teacher, engineer, officer, worker, office worker, technician, etc.). The participants were determined using snowball sampling and the sample size was calculated with a standard deviation (SD) of 9. For 5% Type I error ($\alpha = 0.05$) and approximately 80% power at 95% confidence level, the effect size (d, effect size) was taken as 0.7, i.e., the 0.7 unit difference was predicted to be statistically significant. Based on these values, the optimal sample size was estimated as 635 using the following equation: $n = Z^2 \times \sigma^2 / d^2$ ($n = 1.96^2 \times 9^2 / 0.7^2 = 635$) (the *Z* value for 95% confidence level was 1.96) [18]. Considering the possible problems that may occur during the study process, the study was conducted with 664 individuals based on the minimum sample size.

The survey included three data collection tools: (i) Sociodemographic data form, (ii) Beck Anxiety Inventory (BAI), and (iii) the Dimensional Obsessive-Compulsive Scale (DOCS).

2.1 Ethical Considerations

The study was approved by Dicle University Medical School Ethics Committee (Date: July 16, 2020, No. 242). An informed consent was obtained from each participant before proceeding to the survey.

2.2 Sociodemographic Data Form

The form was created by the researchers to elicit sociodemographic information of the participants in accordance with the purpose of the study.

2.3 Beck Anxiety Inventory (BAI)

BAI is a self-report inventory used for measuring the severity of anxiety in individuals. The scale consists of 21 multiple-choice Likert-type items, each scored on a scale value of 0 (not at all) to 3 (severely), yielding a total score of 0-63. In 1988 and the Turkish reliability and validity study of the scale was conducted by Ulusoy et al. in 1998 [19], cronbach's alpha coefficient was found 0.93 [19]. And in this study Cronbach's alpha coefficient for BAI is 0.88.

2.4 The Dimensional Obsessive-Compulsive Scale (DOCS)

The scale was adapted to Turkish language by Safak et al. [20,21]. DOCS consists of four subdimensions: (a) Contamination-consisting of obsession about germs and infection, (b) Responsibility/ Control-consisting of obsessional doubts of failure to prevent harm, mistakes, or misfortune, (c) Unacceptable Thoughts/Symmetry-consisting of obsessional thoughts and doubts of "taboo" topics such as violence, immorality, sex, religion and blasphemy, and (d) Incompleteness-consisting of concerns about completeness and the need for something to be "complete". In line with the aim of the study, only the Contamination and Responsibility/Control subdimensions were used in the study and the new version of the scale was renamed as DOCS-Abridged (DOCS-A).

In the survey, DOC-A was divided into two sections; the first section included the items in the original version of the scale and was used to assess the existing OC symptoms of the participants. The second section was named "Pre-COVID-19" and used the same items to assess participants' pre-pandemic OC symptoms. The internal consistency coefficient (Cronbach's alpha value) of the whole scale was found to be 0.77.

The internal consistency coefficient for the Contamination and Responsibility/Control subdimensions was 0.68 and 0.64, respectively.

2.5 Statistical Analysis

Data were analyzed using SPSS for Windows version 22.0 (Armonk, NY: IBM Corp.). Correlations between DOCS-A total and subdimension scores and BAI scores were determined using Pearson Correlation Coefficient.

To evaluate the effect of the pandemic on OC symptoms, pre- and post-pandemic DOCS-A total and subdimension scores of the participants were compared with each other using *t*-test for dependent samples. To compare OC symptoms of healthcare professionals and non-healthcare professionals, pre- and post-pandemic DOCS-A total and subdimension scores were compared between the two groups using independent samples *t*-test.

The effects of living with a senior family member (≥65 years) and personal and family history of chronic diseases such as asthma, bronchitis, and diabetes on pre- and post-pandemic DOCS-A total and subdimension scores were evaluated using independent samples *t*-test.

3 Results

The 664 participants included 395 (59.5%) men and 269 (40.5%) women with a mean age of 39.26 ± 9.48 (range, 20–66) years. The participants comprised 180 (27.1%) healthcare professionals (mostly physicians and nurses) and 484 (72.9%) non-healthcare professionals. Among all participants, 31.9% of them were smokers, 12.9% were alcohol abusers, and 67.7% of them were caffeine users. Table 1 presents the sociodemographic characteristics of the participants.

Table 1: Sociodemographic characteristics (N = 664)

		n	%
Marital status	Married	486	73.2
	Never married	145	21.9
	Divorced	33	4,9
Number of children	0	201	30.2
	1	137	20.6
	2	216	32.5
	3	86	12.9
	≥4	24	3.8
Living with a senior family member (≥65 years)	Yes	104	15.6
	No	560	84.4
Educational level	Literate	11	1.7
	Primary school	13	2.1
	Secondary school	11	1.7
	High school	85	12.8
	Pre-bachelor	80	12
	Bachelor	310	46.6
	Master's	84	12.6
	PhD	70	10.5

(Continued)

Table 1 (continued)

		n	%
Personal history of psychiatric disorders	Yes	62	9.33
	No	602	90.66
Family history of psychiatric disorders	Yes	64	9.6
	No	600	90.4
Personal history of chronic diseases	Yes	116	17.4
	No	548	82.6
Family history of chronic diseases	Yes	272	40.9
	No	392	59.1

Pre- and post-pandemic DOCS-A total and subdimension scores were compared with each other using dependent samples *t*-test. The test indicated that post-pandemic DOCS-A total and subdimension scores were significantly higher than pre-pandemic scores ($p < 0.001$ for both) (Tables 2 and 3).

Table 2: Pre- and post-pandemic DOCS-A total and subdimension scores

	Pre-pandemic (A)	Post-pandemic (B)	*t* (664)
DOCS-A total	11.26 ± 5.67	6.21 ± 4.54	24.60***
Contamination subdimension	5.90 ± 2.99	2.99 ± 2.44	25.53***
Responsibility/Control subdimension	5.36 ± 3.34	3.22 ± 2.87	18.36***

***$p < 0.001$
DOCS-A: The Dimensional Obsessive-Compulsive Scale-Abridged

Table 3: Comparison of pre- and post-pandemic DOCS-A total and subdimension scores

	Post-pandemic DOCS-A total	Pre-pandemic DOCS-A total	*t* (df)
Healthcare professionals	10.73 ± 5.53	5.30 ± 4.25	13.19 (179)***
Non-healthcare professionals	11.46 ± 5.72	6.54 ± 4.61	20.78 (483)***
Personal history of chronic diseases	13.06 ± 5.62	8.19 ± 5.06	9.72 (115)***
No personal history of chronic diseases	10.88 ± 5.62	5.79 ± 4.32	22.60 (548)***
Family history of chronic diseases	12.05 ± 5.96	6.07 ± 4.21	17.05 (272)***
No family history of chronic diseases	10.72 ± 5.40	6.30 ± 4.76	18.09 (391)***

(Continued)

Table 3 (continued)

	Post-pandemic DOCS-A total	Pre-pandemic DOCS-A total	*t* (df)
Female	13.01 ± 5.58	6.82 ± 4.83	17.55 (268)***
Male	10.08 ± 5.43	5.80 ± 4.30	17.78 (395)***
	Post-pandemic Contamination	**Pre-pandemic Contamination**	***t* (df)**
Healthcare professionals	5.78 ± 2.76	2.85 ± 2.21	14.02 (179)***
Non-healthcare professionals	5.95 ± 3.08	3.04 ± 2.52	21.36 (483)***
Personal history of chronic diseases	6.60 ± 2.87	3.75 ± 2.52	10.27 (115)***
No personal history of chronic diseases	5.75 ± 3.00	2.83 ± 2.39	23.36 (548)***
Family history of chronic diseases	6.20 ± 3.09	2.86 ± 2.16	17.84 (272)***
No family history of chronic diseases	5.69 ± 2.91	3.07 ± 2.61	18.50 (391)***
Female	6.76 ± 2.98	3.30 ± 2.51	17.42 (268)***
Male	5.32 ± 2.87	2.78 ± 2.36	19.08 (395)***
	Post-pandemic Responsibility/ Control	**Pre-pandemic Responsibility/ Control**	***t* (df)**
Healthcare professionals	4.96 ± 3.28	2.45 ± 2.59	10.33 (179)***
Non-healthcare professionals	5.51 ± 3.35	3.50 ± 2.92	15.22 (483)***
Personal history of chronic diseases	6.46 ± 3.62	4.44 ± 3.46	6.90 (115)***
No personal history of chronic diseases	5.13 ± 3.23	2.96 ± 2.66	17.04 (548)***
Family history of chronic diseases	5.85 ± 3.52	3.21 ± 2.92	13.30 (272)***
No family history of chronic diseases	5.03 ± 3.16	3.23 ± 2.84	12.89 (391)***
Female	6.26 ± 3.34	3.52 ± 3.08	14.09 (268)***
Male	4.76 ± 3.20	3.02 ± 2.71	12.28 (395)***

***$p < 0.001$
DOCS-A: The Dimensional Obsessive-Compulsive Scale-Abridged, df: degrees of freedom

The effects of living with a senior family member (≥65 years), a personal history of chronic diseases such as asthma, bronchitis, and diabetes, a family history of chronic diseases, profession (healthcare professional *vs*. non-healthcare professional), and gender on pre- and post-pandemic DOCS-A total and subdimension scores were evaluated using dependent samples *t*-test. The analysis showed that post-pandemic DOCS-A total and subdimension scores were significantly higher than pre-pandemic scores with regard to all parameters ($p < 0.001$ for all) (Table 3).

The BAI scores established a moderate positive correlation with post-pandemic DOCS-A total scores (r = 0.49, $p < 0.001$) and a weak positive correlation with pre-pandemic DOCS-A total scores (r = 0.23, $p < 0.001$). A moderate positive correlation was found between pre- and post-pandemic DOCS-A total and subdimension scores (Table 4).

Table 4: Pearson correlation coefficient results

	1	2	3	4	5	6
1. BAI	–					
2. Post-pandemic DOCS-A total	0.49*	–				
3. Pre-pandemic DOCS-A total	0.23*	0.48*	–			
4. Post-pandemic Contamination subdimension	0.48*	0.88*	0.37*	–		
5. Post-pandemic Responsibility/Control subdimension	0.40*	0.91*	0.49*	0.60*	–	
6. Pre-pandemic Contamination subdimension	0.22*	0.39*	0.83*	0.43*	0.27*	–
7. Pre-pandemic Responsibility/Control subdimension	0.18*	0.43*	0.88*	0.22*	0.54*	0.46*

BAI: Beck Anxiety Inventory; DOCS-A: The Dimensional Obsessive-Compulsive Scale-Abridged

*$p < 0.001$

An independent samples *t*-test was conducted to compare DOCS-A total and subdimension scores in pre- and post- pandemic, in personal and family history of chronic diseases, in profession (healthcare professional *vs*. non-healthcare professional), and in gender. The analysis indicated both pre- and post-pandemic DOCS-A total and subdimension scores were significantly higher in women than in men ($p < 0.05$), pre-pandemic DOCS-A total scores were significantly higher in non-healthcare professionals compared to healthcare professionals ($p < 0.05$), both pre- and post-pandemic Responsibility/Control scores were significantly higher in non-healthcare professionals than in healthcare professionals ($p < 0.05$), and both pre- and post-pandemic DOCS-A total scores were significantly higher in participants with a personal and family history of chronic diseases compared to participants with no such history ($p < 0.05$) (Table 5).

Table 5: Comparison of BAI scores with regard to independent variables

	Healthcare professionals (n = 180) Mean ± SD	Non-healthcare professionals (n = 484) Mean ± SD	*t* (df = 662)
BAI	7.91 ± 7.01	5.84 ± 5.76	3.87***
Post-pandemic DOCS-A total	10.73 ± 5.53	11.46 ± 5.72	–1.473
Pre-pandemic DOCS-A total	5.30 ± 4.25	6.54 ± 4.61	–3.14**
Post-pandemic contamination subdimension	5.78 ± 2.76	5.95 ± 3.08	–.668
Pre-pandemic contamination subdimension	2.85 ± 2.21	3.04 ± 2.52	–.899
Post-pandemic Responsibility/Control subdimension	4.96 ± 3.28	5.51 ± 3.35	–1.91*
Pre-pandemic Responsibility/Control subdimension	2.45 ± 2.59	3.50 ± 2.92	–4.24***
Personal history of chronic diseases	**Yes (n = 116) Mean ± SD**	**No (n = 549) Mean ± SD**	**t (df = 663)**
BAI	7.99 ± 6.48	6.06 ± 6.08	3.07**
Post-pandemic DOCS-A total	13.06 ± 5.62	10.88 ± 5.62	3.79***

(Continued)

Table 5 (continued)

	Healthcare professionals (n = 180) Mean ± SD	Non-healthcare professionals (n = 484) Mean ± SD	*t* (df = 662)
Pre-pandemic DOCS-A total	8.19 ± 5.06	5.79 ± 4.32	5.27***
Post-pandemic contamination subdimension	6.60 ± 2.87	5.75 ± 3.00	2.80**
Pre-pandemic contamination subdimension	3.75 ± 2.52	2.83 ± 2.39	3.74***
Post-pandemic responsibility/Control subdimension	6.46 ± 3.62	5.13 ± 3.23	3.92***
Pre-pandemic responsibility/Control subdimension	4.44 ± 3.46	2.96 ± 2.66	5.12***
Family history of chronic diseases	**Yes (n = 273) Mean ± SD**	**No (n = 392) Mean ± SD**	***t* (df = 663)**
BAI	7.35 ± 6.71	5.74 ± 5.71	3.32***
Post-pandemic DOCS-A total	12.05 ± 5.96	10.72 ± 5.40	2.99**
Pre-pandemic DOCS-A total	6.07 ± 4.21	6.30 ± 4.76	–.643
Post-pandemic contamination subdimension	6.20 ± 3.09	5.69 ± 2.91	2.14*
Pre-pandemic contamination subdimension	2.86 ± 2.16	3.07 ± 2.61	−1.091
Post-pandemic responsibility/Control subdimension	5.85 ± 3.52	5.03 ± 3.16	3.15**
Pre-pandemic responsibility/Control subdimension	3.21 ± 2.92	3.23 ± 2.84	-.092
Gender	**Female (n = 269) Mean ± SD**	**Male (n = 396) Mean ± SD**	***t* (df = 663)**
BAI	8.50 ± 6.72	4.97 ± 5.35	7.52***
Post-pandemic DOCS-A total	13.01 ± 5.58	10.08 ± 5.43	6.76***
Pre-pandemic DOCS-A total	6.82 ± 4.83	5.80 ± 4.30	2.86**
Post-pandemic contamination subdimension	6.76 ± 2.98	5.32 ± 2.87	6.23***
Pre-pandemic contamination subdimension	3.30 ± 2.51	2.78 ± 2.36	2.74**
Post-pandemic responsibility/Control subdimension	6.26 ± 3.34	4.76 ± 3.20	5.82***
Pre-pandemic responsibility/Control subdimension	3.52 ± 3.08	3.02 ± 2.71	2.19*

BAI: Beck Anxiety Inventory; DOCS-A: The Dimensional Obsessive-Compulsive Scale-Abridged, SD: Standard Deviation

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

The effects of personal and family history of chronic diseases, profession (healthcare professional *vs*. non-healthcare professional), and gender on BAI scores were also evaluated using independent samples *t*-test. It was revealed that both pre- and post-pandemic BAI scores were significantly higher in women than in men, in healthcare professionals than in non-healthcare professionals, and in participants with a personal and family history of chronic diseases compared to participants with no such history ($p < 0.05$ for all) (Table 5).

4 Discussion

To our knowledge, there has been no large-scale study investigating the effect of the COVID-19 pandemic on obsessive behaviors in society during this study was scheduled. The present study aimed to evaluate the relationship between the increased anxiety levels and OC symptoms during the pandemic and the factors related to these parameters. Based on the current literature, we hypothesized that the increased anxiety levels during pandemics would lead to a significant increase in Contamination and Responsibility/Control obsession subdimensions. The results indicated that OC symptoms increased during the pandemic, a positive correlation was established between anxiety levels and obsessive symptoms, healthcare professionals had higher anxiety levels compared to non-healthcare professionals, non-healthcare professionals had a higher prevalence of OC symptoms during the pandemic compared to healthcare professionals, women had a higher prevalence of OC symptoms compared to men, and participants with a personal and family history of chronic diseases had a higher prevalence of OC symptoms compared to participants with no such history.

Obsession of contamination and compulsive hand-washing have been shown to be among the most common symptoms of OCD during the pandemic [21]. Davide et al. examined the change in symptom severity during the pandemic period in patients who were diagnosed with OCD before the pandemic and found that the severity of obsession and compulsion increased significantly during the pandemic and that the OCD patients that were in remission and that had contamination symptoms before the quarantine experienced more exacerbations during the pandemic [22]. Similarly, Tanir et al. also found that the prevalence of washing/cleaning compulsions increased in children and adolescents during the pandemic [23]. In the literature, washing hands more often and in shorter time periods is recommended during the pandemic. The ‘proper’ hand-washing steps as per recommendations can contribute to a ritualistic pattern. In the pandemic period, the need to clean hands immediately after arriving home or in case of any suspicious contact is cognitively “justified” rather than perceived as a problem. People prompt of their families to ensure strict hygiene measures and vice versa. The mass media is constantly reporting on the possibility of the virus surviving on inanimate surfaces, thereby contributing to contamination concerns. Increased rumination and repeated washing behavior (even bathing) are ‘normalized’ due to the pandemic. Stockpiling masks, soap, cleaning products, and sanitizers can lead to hoarding and panic-buying behavior. Accordingly, all these factors may cause the pandemic to play a role in worsening of OC symptoms [24]. In previous pandemics such as SARS and Middle East Respiratory Syndrome (MERS), exacerbation of OCD was reported particularly within 6–12 months after the pandemic. Meaningfully, the increase in OC symptoms in the active phase of the pandemic may not be evident due to the change in the priorities of public health institutions and inadequate detection [25]. In the present study, the results indicated that the contamination and responsibility/control obsessions increased during the active period of the pandemic.

Our analysis findings showed a moderate positive correlation between anxiety levels and obsession symptoms. OCD and anxiety disorders are closely related disease groups [26]. Coexistence, common genetic factors, increased family burden, and the response to serotonin reuptake inhibitors in treatment and response to exposure-based treatments were similar between the two groups [27–32]. Additionally, according to hierarchical taxonomies of psychopathology, OCD and anxiety disorders are defined as belonging to the same fear sub-factors [33]. These notions explain the positive relationship established between anxiety and OC symptoms in our study. In the COVID-19 pandemic, individuals are likely to have increased concerns about contamination, being infected, and death both for themselves and their relatives due to the nature of the disease. In individuals with anxiety disorders, with the addition of pandemic-related concerns, precautionary behaviors towards the pandemics are likely to transform to contamination and responsibility/control obsessions. During the pandemic period, OCD symptoms can be exacerbated by the mechanisms abovementioned. Accordingly, it is tempting to consider that OCD

patients are likely to have a higher frequency of conditions including health anxiety, panic, and fear of loneliness or meeting with people during the pandemic process.

One of the important findings of our study was that the anxiety levels of healthcare professionals were higher than those of non-healthcare professionals during the pandemic process. It has also been reported in the literature that the healthcare professionals have high anxiety level. British Medical Association's survey during the pandemic showed that 45% of UK doctors are suffering from depression, anxiety, stress, burnout or other mental health conditions relating to, or made worse by, the COVID-19 [34]. Muller et al. in their review study published in 2020, found that the prevalence of anxiety in healthcare workers during the COVID 19 pandemic was 9%–90% (median 24%) [16]. Most studies in this review did not have comparison about pre-peri pandemic period or healthcare professionals and non-healthcare workers. In another study, healthcare professionals were compared according to their occupational groups, and it was found that nurses and doctors experienced more anxiety and OC symptoms than other healthcare workers [35]. Considering that healthcare professionals are at the forefront of the pandemic even at the cost of their lives, they are necessarily likely to be more concerned about the pandemic than the other individuals in the society due to their increased workload and higher risk of infection. A review of studies in healthcare professionals has indicated that: the COVID-19 pandemic has had a negative impact on the psychological health of front-line healthcare professionals, nurses may be at higher risk. As well as underlying organic disease, female gender, concerns about family, fear of infection, lack of personal protective equipment and close contact with COVID-19 were the other risk factors that increase the psychological impact of healthcare workers in the COVID 19 epidemic [36]. Nevertheless, in our sample although healthcare professionals' anxiety levels were found to be higher, their OC symptoms were lower than non-healthcare professionals. The increase in OC symptoms compared to the pre-pandemic period is consistent with the literature [22,37], but it is a remarkable finding that healthcare workers have lower OC symptoms than non-healthcare professionals. Additionally, it was also revealed that healthcare professionals had lower OC symptoms before the pandemic and this difference was due to the responsibility/control scores of the participants. In the same way, this difference was also seen during the pandemic period. This difference could be attributed to the fact that healthcare professionals were relatively more knowledgeable about the infection routes, prevention of transmission, and disease symptoms both before and during the COVID-19 epidemic. Moreover, it could also be an indication that healthcare professionals, despite their increased concerns about being infected, consider that exaggerated measures will lead to loss of labor rather than protecting the individuals. Meaningfully, it is also possible that healthcare professionals may not have had the opportunity to perform compulsive behavior and avoidance during their intense work tempo and that they have had to employ the exposure and response prevention (ERP) technique, which is an effective method in the treatment of OC symptoms, during their clinical practice and spent months in environments and with people that could be a source of contamination and anxiety. These factors might explain the lower avoidance scores in our participants, which measure the severity of obsessive symptoms, and might explain their lower OC symptoms despite their higher anxiety levels.

In our study, a significant increase was found in obsessive symptoms and anxiety levels in individuals with a personal and family history of chronic diseases compared to individuals with no such history. Although COVID-19 affects all age groups, it has a higher mortality risk in the elderly population and in individuals with a compromised immune system. In a study conducted in China, 87% of the cases were aged between 30–79 years, among whom the fatality rate was 2.3% in patients aged 70–79 years and was 14.8% in patients aged 80 years and over [38]. It is commonly known that elderly patients with age-related comorbidities including diabetes mellitus, coronary artery diseases, cerebrovascular diseases, degenerative diseases, and organ failure have a greater fear of contracting COVID-19 and death. Accordingly, they may take greater precautions, wash their hands more frequently, pay extreme attention

to personal hygiene, and follow the social distancing and social isolation rules more strictly. However, when these measures are exaggerated, they may lead to significant losses in the individual's functionality. In the present study, participants with a personal and family history of chronic diseases had a higher prevalence of OC symptoms compared to participants with no such history.

In our study, women had a higher prevalence of OC symptoms compared to men. It is commonly known that all anxiety disorders are more common in women than in men. The same situation is valid for OCD [39]. Accordingly, our findings regarding gender-based differences were consistent with those reported in the literature. OCD typically starts in the early stages of life but can take months to years to be diagnosed. OCD can typically occur in women in the peripartum or postpartum periods while the age of onset extends throughout adolescence [40]. However, despite the early age of onset, the predisposing factors may change. Since the pandemic itself is a stress factor, it may cause the development/exacerbation of OCD symptoms. A study conducted during the pandemic period in Iran reported that the level of anxiety was higher in female participants than in men [41]. Similarly, a study conducted in China reported that more than a quarter of the participants experienced moderate to severe anxiety symptoms during the pandemic and women were more affected [42]. Taken together, these findings implicate that the women are more vulnerable to certain anxiety disorders than men during the pandemic, which could be attributed to their biological predispositions and maybe their increased cleaning and care burden and responsibility.

5 Limitations

Our study was limited in several ways. Since the study was conducted online and no face-to-face diagnostic interviews were conducted with the individuals, it could not be determined whether the symptoms of the patients met the DSM-5/ICD-10 diagnostic criteria and to what extent their functionality was affected. Although we reached a large sample size, our findings may not be generalized to the general population since the participants only consisted of public employees. The study had a cross-sectional nature and thus it may not reflect the long-term effects of the pandemic on obsessions. The findings of the study may not be generalized to all the dimensions of OC symptoms since only the contamination and responsibility/control dimensions were examined. Although the level of OC symptoms was found to increase with the anxiety levels, the findings may not be generalized to all OCD patients. Further structured studies with larger samples and long-term follow-up periods are needed to substantiate our findings.

6 Conclusion

The results indicated a significant increase in OC symptoms during the pandemic period compared to the pre-pandemic period and a moderate correlation between the anxiety levels and OC symptom severity. It was also revealed that female gender and personal or family history of chronic diseases posed a higher risk for the increase in anxiety and OC symptoms and healthcare professionals had a higher risk of developing anxiety symptoms compared to non-healthcare professionals. For this reason, while the pandemic continues, the implementation of programs aimed at increasing the resilience of health workers who have been determined to be at risk will positively affect the functioning of the healthcare system and positively affect the quality of the healthcare service presented to the general population. For this purpose, besides making arrangements to reduce the risks, systemic support programs, adequate information, interventions to increase resilience that have been shown to be beneficial, and facilitating access to psychiatric health care when it is needed are important [36].

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