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The Effects of Yoga on the Health Profile, Depression and Anxiety Levels of the Individuals During the COVID-19 Pandemic Process: A Randomize Trial

COVID-19 Pandemi Sürecinde Yoganın Bireylerin Sağlık Profili, Depresyon ve Anksiyete Düzeyleri Üzerinde Etkileri: Randomize Çalışma

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ABSTRACT Objective: With the effect of the pandemic and a sedentary lifestyle, it is thought that physical health may be negatively affected. Moreover, individuals also experience negative feelings like stress and anxiety due to spending a long time at home, social isolation, changes in daily routines and constant exposure to news stories on the media about the coronavirus. Yoga-based exercises are interventions that are effective on both health and stress. This study was conducted for the purpose of determining the effects of yoga on the health profile, depression and anxiety levels of individuals in the coronavirus disease-2019 (COVID-19) pandemic process. **Material and Methods:** The data in this study were collected by an online survey database (Google Forms) in entire Turkey. A total of 374 individuals were reached, while 137 of these individuals stated that they did yoga-based exercises (Yoga Group), and 237 said they did not take part in any physical activity (Sedentary Group). The questionnaire was open to everyone over the age of 18, and the yoga instructors were asked to share with their groups in order to reach those who exercise yoga-based. The study assessed the participants' general health status by using the Nottingham Health Profile (NHP), depression by the Beck Depression Inventory and anxiety by the Spielberger State-Trait Anxiety Inventory. **Result:** In terms of the health profiles, there were significant differences in those who did yoga (Yoga Group) and the sedentary individuals (Sedentary Group) in all parameters of NHP except for the sleep and social isolation parameters ($p<0.05$). There were also significant differences between the groups in terms of their depression and anxiety levels ($p<0.05$). Besides, no difference was found between those who do yoga 0-14 days and sedentary group. **Conclusion:** These findings show that, in the COVID-19 pandemic period, yoga has positive effects on individual's health profile, depression and anxiety levels.

Keywords: Yoga; depression; anxiety; COVID-19; health profile

ÖZET Amaç: Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] pandemi sürecinde, kişilerin hem evde kaldıkları için hem de virüse yakalanma korkusuyla stres ve kaygı durumları artmıştır. Dahası, kişiler evde daha uzun zaman geçirdikleri için, sosyal izolasyon, günlük rutinlerdeki değişiklikler ve medyada sürekli koronavirüs ile ilgili haberlerle karşılaştıkları için stres ve kaygı gibi olumsuz duygular yaşamaktadırlar. Yoga temelli egzersizler hem fiziksel sağlık hem de stres üzerinde etkili girişimlerdir. Bu çalışmada, pandemi döneminde yoganın mental ve fiziksel sağlık üzerine etkileri incelendi. **Gereç ve Yöntemler:** Bu çalışmada veriler tüm Türkiye'de çevrim içi anket veri tabanı (Google Forms) ile toplanıldı. Toplam 374 kişiye ulaşıldı, bunlardan 137'si yoga temelli egzersizler yaptığını (Yoga Grup), 237 kişi hiçbir fiziksel aktivite yapmadığını (Sedanter Grup) bildirdi. Anket, 18 yaş üstü herkese açık olarak yapıldı, yoga temelli egzersiz yapanlara ulaşabilmek için yoga eğitmenlerinin grupları ile paylaşması istendi. Katılımcıların genel sağlık durumları, Nottingham Sağlık Profili [Nottingham Health Profile (NHP)]; depresyon, Beck Depresyon Envanteri; kaygı durumları ise Spielberger Durumluk-Sürekli Kaygı Envanteri ile değerlendirildi. **Bulgular:** Fiziksel sağlık açısından Yoga Grup ve Sedanter Grup arasında NHP'nin uyku ve sosyal izolasyon parametresi hariç tüm alt parametrelerinde anlamlı farklılık vardı. ($p<0,05$) Depresyon ve kaygı açısından gruplar arasında anlamlı farlılıklar vardı ($p<0,05$). Yoga yapma sürelerine göre gruplar belirlendiğinde sedanterler ile 1 yıldan uzun süredir yoga yapanlar arasında NHP'in uyku parametresi hariç diğer tüm parametreler arasında anlamlı farklılıklar görüldü ($p<0,05$). Bunlara ilaveten 0-14 gün yoga yapanlar ile sedanter grup arasında anlamlı farklılık görülmedi. **Sonuç:** Bu bulgular, COVID-19 pandemi döneminde uzun süreli yoga temelli egzersiz yapmanın genel sağlığı ve mental sağlığı olumlu yönde etkileyebileceğini göstermektedir.

Anahtar Kelimeler: Yoga; depresyon; anksiyete; COVID-19; sağlık profili

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The coronavirus disease-2019 (COVID-19) pandemic is unique in many aspects and has challenged healthcare systems. Nowadays, it is not slowing down globally, and at the same time, a second wave is expected.[1] It is known that, for now, the most important issues in taking this disease under control are contact tracing for infected individuals and achievement of isolation. This is why the World Health Organization declared COVID-19 as a pandemic, and a national emergency has been declared in the United States of America. Temporary curfews have been practiced in many countries in the world including Turkey.[2] The start of a sudden quarantine situation indicates a radical change in the lifestyles of the population. Changing lifestyles and behaviors may result in insufficient physical activity levels and inadequate movement.[3,4] Moreover, the media constantly provide reports to inform people about everything regarding the pandemic situation. All these create high anxiety levels in people and cause concerns. Epidemics may lead to an increase in stress, and anxiety is a common response given to stressful situations.[5]

For individuals to be able to overcome this process healthily, it is highly important for them to adapt to this life. In the pandemic process, one needs to stay active for physical and mental health and maintain a physical exercise routine.[6] For people's lifestyles to not change and health to not deteriorate, it is highly important for them to continue an active life at home.[7] Individuals use alternative exercise types to protect their both physical and mental health in this process. One of such exercises is yoga.

Yoga is a very old method originating from India whose philosophy is based on bodily balance and being healthy in physical, mental and emotional aspects.[8] Studies have shown the positive effects of yoga on people in the psychological and mental sense and proposed that it increases the quality of life of individuals.[9]

In the COVID-19 pandemic process, yoga is an exercise that is possible to do at home. This study was conducted for the purpose of determining the effects of yoga on individuals' health profile, depression and anxiety levels in the COVID-19 pandemic process.

Recommendations should be made to prevent health consequences in people with social isolation associated with COVID-19 pandemic. The mental, physical and psychological factors of the individuals should be taken into consideration in the measures to be taken in order to prevent the epidemic in possible social isolation periods. Multidisciplinary approaches should be adopted in protecting and maintaining the health of individuals in the cycles of these processes that affect each other. The results of this study show that health professionals can use yoga-based exercises in treatment and preventive mental health interventions in terms of general health, anxiety, and depression.

MATERIAL AND METHODS

PARTICIPANTS

Ethics board approval of the study was obtained from İstanbul Okan University (no: 56665618-204.01.07, date: 11.06.2020). The data of the study were collected by an online survey database (Google Forms) in May 2020 where temporary curfews were effective in Turkey in the COVID-19 pandemic process. Access to the survey database was kept open for 2 weeks, and the data were collected from individuals who volunteered to participate. The study included individuals who were 18 years or older, literate in Turkish and had access to the internet. At the beginning of the survey, the purpose of the study was explained, and the consent of the participants was asked. Those who agreed to participate were able to go on to the survey. In this study, the questionnaire was made open to everyone over the age of 18, yoga instructors were asked to share with their groups on social media in order to reach yoga-based exercises. Analyses were carried out by dividing the participants into two groups as those who did yoga and those who were sedentary. The demographic information of the participants is given in Table 1. The study was conducted in accordance with the principles of the Declaration of Helsinki. Approval from the Ministry of Health was obtained for this study.

OUTCOME MEASURES

The data of the study were obtained by using a 'questionnaire form' regarding the personal and exercise-related characteristics of the participants, the Nottingham Health Profile (NHP), Beck Depression Inventory (BDI) and Spielberger State-Trait Anxiety Inventory (STAI).

Question Form: The patient information form was prepared by the researchers by reviewing the literature and included questions on personal characteristics and the COVID-19 pandemic process. Personal characteristics included age, sex, body mass index, education status, occupation, individuals living with them, marital status, cigarette-alcohol habits, presence of a chronic disease, whether or not they received a diagnosis of COVID-19 and how the process progressed if they did, whether or not they did yoga and for how long they had been doing yoga.

Nottingham Health Profile: The NHP which was developed by Hunt and McEwen is used to determine the relationship between health problems and prevalent daily activities. The validity and reliability of the Turkish version of NHP were proven by scientific fit procedures. This questionnaire consists of 38 items and assesses 6 dimensions regarding energy (3 items), pain (8 items), emotional reactions (9 items), sleep (5 items), social isolation (5 items) and physical activity (8 items). The items are yes/no questions. Each part is scored between 0 and 100, where 0 points indicate the best possible health status, and 100 points indicate the worst possible health status. This study evaluates the sub-scores and total scores of NHP. The total score is obtained by combining the sub-scores of NHP.[10]

Beck Depression Inventory: The risk of the participants for depression and depressive symptoms was assessed by using the BDI. It is an easy to apply, reliable and validated scale. This 4-point Likert-type scale that was developed by Beck to measure depressive symptoms like pessimism, feeling of failure, dissatisfaction, feeling of guilt, restlessness, fatigue, appetite, undecidedness, sleep disorder and social aspects consists of 21 items. Each item is scored between 0 and 3. The total score range in the inventory is 0 to 63.[11]

Spielberger State-Trait Anxiety Inventory: It is a Likert-type instrument whose responses vary between "not at all" and "absolutely" developed by Spielberger et al. The validity and reliability study of the scale was conducted by Öner in 1977. It consists of two parts containing 20 questions in each and assessing state anxiety and trait anxiety. The feelings of the individual at a certain time and in a certain condition are measured by the State Anxiety Inventory, while how they feel in general independently of the situation or condition they are in is measured by the Trait Anxiety Inventory. While its cut-off score varies in the range of 36-41, in general, 0 to 30 points indicate low, 31 to 49 points indicate moderate and 50 or higher points indicate high anxiety levels.[12]

DATA ANALYSIS

The statistical analyses were carried out by using IBM SPSS Statistics version 22.00. The descriptive characteristics are presented as mean±standard deviation ($\bar{x}$±SD) or n (%). In the comparison of the BDI, STAI and NHP scores between two groups, the normal distribution of the data was tested by Shapiro-Wilk test, whereas independent-samples t-test was used to compare two groups for the normally distributed data, and Mann-Whitney U test was used for the non-normally distributed data. The difference between the qualitative variables in two groups was assessed by Pearson's chi-squared test with the method of crosstabulation. In the statistical analyses, the level of significance was accepted as $p<0.05$.

RESULTS

The chi-squared test revealed significant group differences in terms of sex ($p<0.01$). A two-tailed t-test revealed no significant group difference in terms of age ($p=0.238$) (Table 1).

The general health profile parameters were significantly better in the yoga group than the sedentary group except for the parameters of sleep and social isolation (Table 2).

The depression and anxiety scores were significantly lower in the yoga group than the sedentary group ($p<0.05$) (Table 3).

DISCUSSION

In the COVID-19 pandemic process, yoga is an exercise that is possible to do at home. This study was conducted for the purpose of determining the effects of yoga on individuals' health profile, depression and anxiety levels in the COVID-19 pandemic process. As a result of this study, it was seen that yoga had positive effects on individuals' depression

TABLE 1: Demographics.

		Sedentary Group (Mean±SD) n=237	Yoga Group (Mean±SD) n=137	p value
Age		31.08±9.90	29.55±9.09	0.238
Weight (kg)		68.7±15.11	60.24±10.96	<0.001
Height (cm)		167±10	167±70	0.975
BMI (kg/m²)		24.54±4.72	21.53±2.88	<0.001
		n (%)	n (%)	
Sex	Male	70 (29.5)	20 (14.6)	<0.01
	Female	167 (70.9)	117 (85.4)	<0.01
			n	%
Yoga practice time	0-14-day		10	7.3
	15 day-1 month		16	11.7
	1-6 month		30	21.9
	6 month- 1 year		15	10.9
	More than 1 year		66	48.2

SD: Standard deviation; p: Independent t-test; BMI: Body mass index.

TABLE 2: General health profile.

Nottingham Health Profile	Sedentary Group (Mean±SD) n=237	Yoga Group (Mean±SD) n=137	p value
Pain	14.79±21.65	6.14±14.18	***<0.001***
Emotional reactions	26.71±29.34	17.79±25.74	**0.003**
Sleep	30.01±31.26	27.08±29.20	0.564
Social isolation	24.89±33.82	16.49±25.67	0.082
Physical activity	10.22±16.03	4.44±9.10	***<0.001***
Energy	28.38±37.82	14.87±29.37	***<0.001***
Part 1 total profile score (1-600)	135.01±127.38	86.81±104.93	***<0.001***
Part 2 (0-7)	0.44±1.21	0.11±0.64	***<0.001***

SD: Standard deviation; p: Independent t-test.

and anxiety levels during the pandemic process. As a result of this study, it was seen that yoga had positive effects on individuals' depression and anxiety levels during the pandemic period, general health status was found to be better in those who do yoga. There was an inherent difference in weight and body mass index (BMI) between the two groups, as a fully sedentary group was compared with those who practiced yoga.

The findings that COVID-19 has a high incidence of mortality in especially those with chronic diseases and the elderly suggests a connection with the immune system. Studies that have been conducted have revealed such a connection. Paces et al. stated that the immune system plays a critical role in

TABLO 3: Depression and anxiety levels.

	Sedentary Group (Mean±SD) n=237	Yoga Group (Mean±SD) n=137	p value
Beck Depression Inventory	12.08±9.42	8.06±7.02	***<0.001***
Trait anxiety	43.82±10.01	38.73±9.52	***<0.001***
State anxiety	41.79±11.74	36.23±10.45	***<0.001***

SD: Standard deviation; p: Independent t-test.

the progression and severity of the disease. The severe acute respiratory syndrome-coronavirus-2 virus especially affects cells in the lower respiratory region and suppresses the local immune system fast. It is claimed that the immune system needs to be targeted to prevent the progression of the disease, and therapeutic approaches towards this should be ap-

plied.[13] Accordingly, one of the various approaches to fight against COVID-19 or be protected may be yoga.

Similarly, Chen et al. determined that 8 weeks of practicing hatha yoga reduced the plasma insulin, cholesterol levels and proinflammatory cytokine secretion levels in the serum in Chinese women.[14] Based on this, the finding in our study that yoga and the levels of depression and anxiety were related suggested that this relationship may be associated with the effects of yoga on the immune system.

It is known that yoga has positive effects on mental disorders. Stress causes imbalance in the endocrine levels released from the hypothalamus and pituitary gland and in the autonomic nervous system.[15] Studies have shown that Yoga regulates the hypothalamus, pituitary gland, and sympathetic nervous system's responses to stress, lowers blood sugar, 24-hour urea epinephrine-norepinephrine levels, and overcomes the negative effect of stress on the immune system by increasing the level of immunoglobulin.[16,17] While the sympathetic nervous system comes into play in high-intensity activities, parasympathetic activity comes into play with the relaxation response and physiological de-activation response in yoga. Especially, positive results on stress are obtained by providing relaxation with the release of dopamine and serotonin, which affect emotional changes.[18] Yoga takes a holistic approach, strengthens muscles, preserves posture, provides flexibility, regulates breathing, and relaxes the body to feel lighter and more energetic. Yoga is a comprehensive exercise program that affects the mind with proper body position, concentration, relaxation, breathing and physical exercises. It has been reported that breathing and relaxation exercises reduce physical stresses and have positive effects on sleep problems.[19] Studies have shown that yoga has psychological and mental positive effects on people and suggests that it increases the quality of life of individuals.[9,20]

Worldwide, the COVID-19 pandemic leads to additional health issues such as stress, anxiety, depressive symptoms, sleeplessness, denial, anger and fear. Collective anxieties may weaken COVID-19 management strategies and cause a higher level of disease and mental healthcare needs on the global level.[21] Yoga interventions have potentially useful effects on depressive disorders. Five randomized controlled studies using different types of yoga each have reported positive findings.[22]

In this study, when the health profiles, depression and anxiety levels of those who did yoga-based exercises were compared to those who had a sedentary lifestyle, significant differences were observed. Towards the end of the month of March (2020), temporary curfews were started in Turkey. When the data of the study were being collected, people had been isolated at home for 2 months. Yoga is generally perceived as a stress management instrument that may help alleviate depression and anxiety disorders. Javnbakht et al. observed that yoga led to a significant decrease in the perceived anxiety levels in women suffering anxiety disorders who joined a two-month yoga class.[20]

Yoga-based exercises are used to regulate the autonomous nervous system. Dysfunction of the autonomous nervous system is associated with depression and anxiety. Yoga practices may increase the effect of the parasympathetic nervous system (PNS) and GABA systems through stimulation of the vagus nerves that are partially the primary peripheral path of PNS. There are some studies which have shown that yoga actually increases PRN activity, raises GABA levels in the thalamus, and these increases are associated with an improved mental state. Researchers have also proposed that yoga may have a positive effect on the relevant biological pathways. Yoga may reduce the activation of the hypothalamic-hypophysis-adrenal axis, but the evidence so far is inconsistent. Last of all, there is some evidence that indicate yoga may be useful in reducing inflammation. A change in these biological pathways may affect the underlying pathophysiology of depression and anxiety.[23] It was reported that, applying yoga for 8 weeks in rheumatoid arthritis patients reduced the levels of various systemic inflammatory markers, and the functional statuses of the patients were improved.[24]

In a study conducted to investigate the negative effects of the COVID-19 pandemic on the mental

health of Chinese university students, it was concluded that the severity of the COVID-19 pandemic has an indirect effect on negative emotions by affecting sleep quality.[25] In this study, an effect of yoga, albeit low-level, was seen on the sleep parameter of the individuals, but the difference in comparison to those who were sedentary was not statistically significant. On the other hand, yoga was determined to reduce stress and anxiety.

There are many types of yoga. The main known yoga types are Laya, Tantrik, Mantra, Bhatki, Karma, Raja, Yin, Jnana and hatha yoga. When a few previous studies on yoga are examined, it is seen that the type of yoga is not specified.[26] Hatha yoga and Iyengar yoga are the most frequently studied yoga styles.[27,28] In this study, the type of yoga the participants practiced and their exercise durations were not questioned. Those who do other types of exercise other than yoga were excluded from the study.

In a study involving 40 yoga instructors and 378 yoga students, a negative correlation was found between depression, anxiety and stress scores and awareness and self-compassion scores in yoga practices that lasted for months, and higher awareness and self-compassion scores were observed in yoga practices that lasted shorter.[29] The data of this study were collected 6 weeks after the pandemic started. It was observed that 51.8% of the yoga group started yoga with the start of social isolation.

It should be recognized that, even in the normal course of events, people with established mental illness have a lower life expectancy and poorer physical health outcomes than the general population.[30] As a result, people with pre-existing mental health and substance use disorders will be at increased risk of infection with COVID-19, increased risk of having problems accessing testing and treatment and increased risk of negative physical and psychological effects stemming from the pandemic.

We anticipate a considerable increase in anxiety and depressive symptoms among people who do not have preexisting mental health conditions, with some experiencing post-traumatic stress disorder in due course. There is already evidence that this possibility has been under-recognized in China during the current pandemic.[31]

LIMITATIONS

There were several limitations of this study. How many times and for how long the participants did yoga-based exercises was not questioned. Furthermore, the type of yoga they practiced was also not recorded. In addition, since the study was conducted on an online database, no selection could be made regarding gender.

CONCLUSION

Within these limitations, this study has shown that yoga-based exercises may be an instrument that has positive effects on individuals' health profiles, depression and anxiety levels in the pandemic process. In fact, for the best benefits possible, it is highly important to do yoga-based exercises at an appropriate dose and for an appropriate duration.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Emine Atıcı;* ***Design:*** *Emine Atıcı;* ***Control/Supervision:*** *Mustafa Gülşen, Fadime Doymaz;* ***Data Collection and/or Processing:*** *Emine Atıcı, Fadime Doymaz, Mustafa Gülşen, Merve Ecem Dan;* ***Analysis and/or Interpretation:*** *Kübra Kendal;* ***Literature Review:*** *Merve Ecem Dan, Kübra Kendal;* ***Writing the Article:*** *Emine Atıcı, Mustafa Gülşen;* ***Critical Review:*** *Emine Atıcı, Fadime Doymaz;* ***Materials:*** *Emine Atıcı, Merve Ecem Dan.*

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