

# The effects of social isolation measures taken against the COVID-19 pandemic on erectile functions of healthcare professionals: a prospective comparative study

COVID-19 pandemisine karşı alınan sosyal izolasyon önlemlerinin sağlık çalışanlarının erektil fonksiyonları üzerine etkileri: prospektif karşılaştırmalı bir çalışma

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## Özet

**Amaç:** Bu çalışmada, COVID-19 pandemisinin doktor, hemşire, tıbbi sekreter, hastane personeli gibi farklı görevlerde bulunan sağlık çalışanları üzerinde yarattığı kaygının erektil disfonksiyona (ED) neden olup olmadığını araştırmayı amaçladık.

**Gereç ve Yöntemler:** 1 Mayıs-1 Ağustos 2020 tarihleri arasında, son altı aydır haftada en az bir kez düzenli cinsel ilişkide bulunan ve daha önce COVID-19 kliniklerinde çalışmamış gönüllü erkek sağlık çalışanları çalışmaya dahil edildi. COVID-19 kliniklerinde çalışmadan önce ve çalışmaya başladıktan 4 hafta sonra, erektil fonksiyon Uluslararası Erektil Fonksiyon İndeksi-5 (IIEF-5) formu ile belirlendi. Anksiyete bozukluklarını ve şiddetini değerlendirmek için ise Hamilton Anksiyete Derecelendirme Ölçeği (HAM-A) kullanıldı.

**Bulgular:** Çalışmaya toplam 218 erkek sağlık çalışanı dahil edildi. Bunların 56'sı (%25,7) doktor, 81'i (%37,2) hemşire, 46'sı (%21,1) tıbbi sekreter ve 35'i (%16,1) sağlık personeliydi. Doktorların, COVID-19 servislerinde çalıştıktan 4 hafta sonra ölçülen HAM-A puanının (3,32±4,68), COVID-19 servislerinde çalışmadan önce ölçülen ortalama HAM-A puanına (28,43±14,05) göre anlamlı düzeyde yüksek olduğunu tespit ettik (p<0.001). Doktorların, COVID-19 servislerinde çalıştıktan 4 hafta sonra ölçülen ortalama IIEF-

## Abstract

**Objective:** In this study, we aimed to investigate whether the anxiety caused by the COVID-19 pandemic on healthcare professionals with different duties, such as doctors, nurses, medical secretaries, and medical staff, causes erectile dysfunction (ED).

**Material and Methods:** In between 1 May 2020 and 1 August 2020, volunteering male health workers who had regular sexual intercourse at least once a week for the last six months and who had not previously worked in COVID-19 clinics were included in the study. Before and 4 weeks after working in COVID-19 clinics, erectile function was determined by the International Index of Erectile Function-5 (IIEF-5) form. The Hamilton Anxiety Rating Scale (HAS) was used to evaluate anxiety disorders and their severity.

**Results:** A total of 218 male health caregivers were included in the study. Among these, 56 (25.7%) were doctors, 81 (37.2%) were nurses, 46 (21.1%) were medical secretaries and 35 (16.1%) were the medical staff. The mean HAM-A score of the doctors measured 4 weeks after having worked in a COVID-19 clinic (3,32±4,68) was observed to be significantly higher compared to that measured before working (28,43±14,05) (p<0.001). The mean IIEF-5 scores of the doctors measured 4 weeks after having worked in a COVID-19 clin-

The study was approved by Ethical Committee of Erzurum Regional Training and Research Hospital (Approval No: 2020/08-93, Date: 20 April, 2020). All research was performed in accordance with relevant guidelines/regulations, and informed consent was obtained from all participants.

5 puanlarının (16,34±4,11), COVID-19 servislerinde çalışmadan önce ölçülen ortalama IEF-5 puanına (22,29±2,35) göre anlamlı düzeyde düşük olduğunu tespit ettik ( $p<0.001$ ).

**Sonuç:** Sonuçlarımız COVID-19 kliniklerinde çalışan sağlık çalışanlarının anksiyete ve ED düzeylerinin arttığını ve bu durumdan doktorların diğer sağlık çalışanlarına göre daha fazla etkilendiğini göstermektedir.

**Anahtar Kelimeler:** COVID-19, sağlık çalışanları, erektil disfonksiyon, anksiyete, hamilton anksiyete ölçeği

ic (16,34±4,11) was observed to be significantly lower compared to that measured before working (22,29±2,35) ( $p<0.001$ ).

**Conclusion:** Our results indicate that healthcare professionals working in COVID-19 clinics have increased anxiety and ED, and physicians are affected more than the other healthcare professionals.

**Keywords:** COVID-19, health professionals, erectile dysfunction, anxiety, hamilton anxiety scale

## INTRODUCTION

A series of pneumonia cases were observed in December 2019 in the city of Wuhan, China, and a new type of coronavirus was shown to cause this pneumonia (SARS-CoV-2), and the disease was named coronavirus-2019 (COVID-19) (1,2). The World Health Organization (WHO) reported the COVID-19 infection as a pandemic in March 2020 (3,4). By 5 May 2022, a total of 516.111.527 cases with COVID-19 and 6.273.115 deaths were reported worldwide, depending on the case definitions and test strategies within the affected countries (5). The COVID-19 pandemic is a lot more than a health crisis and has the potential to cause destructive problems with serious effects within societies (6).

ED is defined as permanent insufficiency in reaching and continuing a sufficient erection to provide a satisfactory sexual performance (7). ED affects more than half of the male population aged 40-70 years (8). In addition to psychogenic factors, neurogenic, vasculogenic and hormonal factors play a role in the pathophysiology of ED (9). Studies demonstrate a significant relation of ED with depression and anxiety (10,11). There are studies reporting that some individuals in the general population experienced psychological abnormalities such as anxiety and depression during the COVID-19 pandemic. (12-14). It is an expected situation that health caregivers that struggle actively against the COVID-19 pandemic perceive it at even a stronger extent. Likewise, a recent meta-analysis has reported early-evidence of major anxiety, depression, and insomnia in health caregivers subsequent to the COVID-19 pandemic (15).

We hypothesized that anxiety caused by the COVID-19 pandemic may lead to or exacerbate ED in health caregivers who actively struggle against the disease.

In this study, we aimed to determine the prevalence and severity of anxiety-related ED among healthcare professionals working in COVID-19 clinics and to contribute to the related literature.

## MATERIAL AND METHODS

This study was approved by the local ethics committee (Approval Number: 2020/08-93) and designed prospectively. During the COVID-19 pandemic, our hospital has given health services to patients both with and without COVID-19 infection. Meanwhile and especially during the periods with increased number of infected cases, the healthcare professionals who work in departments other than COVID-19 clinics (doctors, nurses, medical secretaries, and other staff) were assigned to COVID-19 clinics. In our hospital, a total of 2577 healthcare staff has been working, and these included 456 doctors, 1115 nurses, 115 medical secretaries and 891 staff (cleaning, patient care). Among these, 1417 (55%) were female 1160 (45%) were male.

In between 1 May 2020 and 1 August 2020, male health caregivers who had a regular sexual relationship for the last six months, which was a minimum of once a week, and who were not assigned to a COVID-19-related department prior to the study, were included in the study. Age, body mass index (BMI), history of a chronic or psychiatric disease and history of medication of the participants were questioned and recorded. Female health caregivers, males with a history or fami-

ly history of COVID-19 infection, those with an IIEF-5 score of <17 prior to the study (with severe, moderate, mild to moderate ED), those with a history of a disease or medication that may have a role in the etiology of ED and those who smoked were excluded from the study. The study included a total of 218 male health caregivers who fulfilled the inclusion criteria. The participants were classified into 4 groups as doctors, nurses, medical secretaries, and other staff. The monthly working hours of each group was between 140-160.

The erectile function of the health caregivers before and 4 weeks after working in COVID-19 clinics were determined using the International Index of Erectile Function-5 (IIEF-5) form that had been translated to Turkish and validated (16). According to the IIEF-5 scoring system, the severity of ED was classified as severe (1-7), moderate (8-11), mild-moderate (12-16), mild (17-21), and no ED (22-25). Evaluation of anxiety disorders and their severity were carried out using the Turkish version of the Hamilton Anxiety Rating Scale (HAM-A), the reliability and validity of which were confirmed. HAM-A is a 14-article scale designed to evaluate and measure the severity of anxiety. It includes items that evaluate both psychiatric and somatic symptoms of anxiety. Each article is graded by a Likert-type scale that is between 0 (absent) and 4 (very severe); higher scores indicate more severe anxiety (17). Classification of the severity of anxiety according to the HAS scores: 0-7=no/minimal anxiety; 8-14=mild anxiety; 15-23=moderate anxiety, and 24 or higher=severe anxiety (18). The IIEF-5 and the HAM-A forms were fulfilled by the same urologist and psychiatrist by meeting the participants face-to-face before and 4 weeks after working in COVID-19 clinics, and the results of the survey were compared statistically.

### Statistical Analysis

Statistical analysis was performed with the IBM SPSS v17.0 software package (SPSS Inc., Chicago, Illinois, USA). Descriptive data were expressed as mean  $\pm$  standard deviation (SD), numbers, and percentages. The normal distribution of the variables was checked with the Shapiro-Wilk test. The mean differences between the respective groups of data that were not normally distributed were compared with the Wilcoxon test. Categorical variables were analyzed using Pearson

Chi-Square and Fisher Exact tests. Intragroup comparisons for occupational groups were made using the Paired Sample T-test, and for intergroup comparisons using the One-Way ANOVA test. Post-Hoc Bonferroni Correction test was conducted to find out which occupational group caused the difference. A p-value of <0.05 was considered statistically significant.

### RESULTS

A total of 218 male healthcare professionals were included in the study. Among these, 56 (25.7%) were doctors, 81 (37.2%) were nurses, 46 (21.1%) were medical secretaries and 35 (16.1%) were other medical staff. The demographic characteristics of the participants according to their occupational groups have been demonstrated in Table 1.

The mean HAM-A score of the doctors measured 4 weeks after having worked in a COVID-19 clinic ( $3,32 \pm 4,68$ ) was observed to be significantly higher compared to that measured before working ( $28,43 \pm 14,05$ ) ( $p < 0.001$ ). The mean IIEF-5 scores of the doctors measured 4 weeks after having worked in a COVID-19 clinic ( $16,34 \pm 4,11$ ) was observed to be significantly lower compared to that measured before working ( $22,29 \pm 2,35$ ) ( $p < 0.001$ ). Comparison of the survey outcomes according to occupational groups before and 4 weeks after working in COVID-19 clinics have been demonstrated in Table 2.

No significant difference was observed in the severity of anxiety and erectile dysfunction between the occupational groups before working in a COVID-19 clinic ( $p = 0.172$  and  $p = 0.729$ , respectively), whereas a significant difference was observed 4 weeks after having worked in a COVID-19 clinic ( $p < 0.001$  and  $p < 0.001$ , respectively) (Table 3).

The multiple comparison test was performed to determine the group that led to this difference. The results revealed doctors as the group that led to difference for the HAM-A scores and the IIEF-5 scores (Table 4).

According to the post-hoc test, the total HAM-A scores of the doctors were significantly higher compared to nurses, medical secretaries, and other medical staff 4 weeks after they had worked in a COVID-19 clinic ( $p < 0.05$ ), whereas the IIEF-5 scores were significantly lower compared to medical secretaries and other medical staff ( $p < 0.05$ ) (Table 5).

**Table 1.** Comparative results of demographic data of occupational groups

	Doctor	Nurse	Secretary	Staff	p
	n=56	n=81	n=46	n=35	
Age (year)	30,1±5,3	28,1±5,2	32,1±4,6	33,0±5,0	0.814*
BMI (kg/m <sup>2</sup> )	26.4 ± 3.1	25.9 ± 3.8	24.9 ± 2.8	25.4 ± 2.1	0.110*

Values were expressed as mean ± standard deviation. BMI: body mass index, \* One Way ANOVA,

**Table 2.** Comparison of the survey outcomes according to occupational groups before and 4 weeks after working in COVID-19 clinics

	Doctor n=56 (%16)			Nurse n=81 (%21,1)			Secretary n=46 (%37,2)			Staff n=35 (%25,7)		
	BW	AW	P*	BW	AW	P*	BW	AW	P*	BW	AW	P*
HAM-A Score	3,3±4,6	28,4±14,0	<0,0001*	3,1±4,8	17,3±8,8	<0,0001*	3,4±4,9	12,4±8,3	<0,0001*	5,1±6,8	19,3±13,6	<0,001*
IEFF-5 Score	22,2±2,3	16,3±4,1	<0,0001*	22,4±2,3	17,7±3,7	<0,0001*	21,7±3,2	19,4±3,8	<0,0001*	21,3±3,2	19,5±3,6	<0,001*

Values were expressed as mean ± standard deviation. **HAM-A:** Hamilton Anxiety Rating Scale, **IEFF-5:** International Index of Erectile Function-5, **BW:** Before working in COVID-19 clinics, **AW:** 4 weeks after working in COVID-19 clinics, \* Paired Sample t-Test

**Table 3.** Comparison of the anxiety and ED severity according to occupational groups before and 4 weeks after working in COVID-19 clinics

		Doctor n (%)	Nurse n (%)	Secretary n (%)	Staff n (%)	Total n (%)	P
<b>BW</b>							
<b>Anxiety severity (score)</b>	No/minimal anxiety (0-7)	53 (94,6)	76 (93,8)	41 (89,1)	30 (85,7)	200 (91,7)	0.172*
	Mild (8-14)	1 (1,8)	3 (3,7)	4 (8,7)	1 (2,9)	9 (4,1)	
	Moderate (15-23)	2 (3,6)	2 (2,5)	1 (1,8)	4 (2,2)	9 (11,4)	
	Severe (>23)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
<b>Total</b>		56 (100)	81 (100)	46 (100)	35 (100)	218 (100)	
<b>AW</b>							
<b>Anxiety severity (score)</b>	No/minimal anxiety (0-7)	6 (10,7)	22 (27,2)	23 (50,0)	12 (34,3)	63 (28,9)	0.001*
	Mild (8-14)	7 (12,5)	14 (17,3)	12 (26,1)	2 (5,7)	35 (16,1)	
	Moderate (15-23)	15 (26,8)	30 (37,0)	6 (13,0)	11 (31,4)	62 (28,4)	
	Severe (>23)	28 (50,0)	15 (18,5)	5 (10,9)	10 (28,6)	58 (26,6)	
<b>Total</b>		56 (100)	81 (100)	46 (100)	35 (100)	218 (100)	
<b>BW</b>							
<b>ED severity (score)</b>	No ED (22-25)	33 (58,9)	52 (64,2)	31 (67,4)	20 (57,1)	136 (62,4)	0.729*
	Mild (17-21)	23 (41,1)	29 (35,8)	15 (32,6)	15 (42,9)	82 (37,6)	
	Mild-moderate (12-16)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Moderate (8-11)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Severe (5-7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
<b>Total</b>		56 (100)	81 (100)	46 (100)	35 (100)	218 (100)	
<b>AW</b>							
<b>ED severity (score)</b>	No ED (22-25)	5 (8,9)	14 (17,3)	18 (39,1)	13 (37,1)	50 (22,9)	0.001*
	Mild (17-21)	18 (32,1)	39 (48,1)	20 (43,5)	13 (37,1)	90 (41,3)	
	Mild-moderate (12-16)	26 (46,4)	23 (28,4)	8 (17,4)	9 (25,7)	66 (30,3)	
	Moderate (8-11)	7 (12,5)	5 (6,2)	0 (0)	0 (0)	12 (5,5)	
	Severe (5-7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
<b>Total</b>		56 (100)	81 (100)	46 (100)	35 (100)	218 (100)	

ED: Erectile dysfunction, BW: Before working in COVID-19 clinics, AW: 4 weeks after working in COVID-19 clinics,

\* Pearson chi square

**Table 4.** Comparative results of HAM-A and IIEF-5 scores of health professionals before and 4 weeks after working in COVID-19 clinics

	Mean $\pm$ Standard Deviation (n:218)	95% Confidence Interval Lower Limit-Upper Limit	P
<b>BW</b>			
HAM-A score	3,6 $\pm$ 5,1	2,9-4,3	0,259
IIEF Score	22,0 $\pm$ 2,7	21,7-22,4	0,138
<b>AW</b>			
HAM-A score	19,4 $\pm$ 12,4	17,4-21,0	<0,0001*
IIEF Score	18,0 $\pm$ 4,0	17,4-18,5	<0,0001*

Values were expressed as mean  $\pm$  standard deviation. **HAM-A:** Hamilton Anxiety Rating Scale, **IIEF-5:** International Index of Erectile Function-5, **BW:** Before working in COVID-19 clinics, **AW:** 4 weeks after working in COVID-19 clinics, \* **One Way ANOVA**

**Table 5.** Post-hoc comparative results of HAM-A and IIEF-5 scores of health caregivers

	Profession		95% Confidence Interval		P
			Lower Limit	Upper Limit	
HAM-A Score	Doctor	Nurse	5,9	16,2	
		Secretary	10,0	21,9	
		Staff	2,9	15,7	
IIEF-5 Score	Doctor	Secretary	-5,1	-1,1	
		Staff	-5,3	-0,9	

Values were expressed as mean  $\pm$  standard deviation. **HAM-A:** Hamilton Anxiety Rating Scale, **IIEF-5:** International Index of Erectile Function-5, \* **One Way ANOVA, Post Hoc**

## DISCUSSION

We have established the hypothesis that there may be a relationship between anxiety and ED in healthcare workers who play an active role in the COVID-19 pandemic, and we have determined that both anxiety and the ED severity increase in healthcare professionals working in the COVID-19 clinics. Furthermore, this study demonstrated that the severity of ED was different among different occupational groups of health caregivers in the COVID-19 pandemic.

ED affects the quality of life of the individual to an important extent. Clearing the etiology of ED in order to develop effective preventive and therapeutic strategies against it, is one of the subjects of priority in the field of health (11). The organic causes and depression are those investigated widely, whereas the correlation between anxiety and ED has encountered less interest (19). However, there are a few studies showing the relationship between anxiety and ED (11,20). This study

was conducted on young and healthy individuals with no history of chronic disease or smoking habit, which eliminated the other possible causes of ED. In our study, a significant reduction was observed in the IIEF-5 scores of the participants after they had worked in the COVID-19 clinic (<0.001) and a significant increase was observed in the severity of ED (<0.001). This suggests psychogenic causes of the situation and indicates the negative effects of the COVID-19 pandemic on health caregivers.

In order to prevent the spread of COVID-19, different types of public health measures (social isolation, quarantine and curfews) have been implemented by governments. Although these precautions are important in order to place the infection under control, it is not a good experience for those who are exposed. These people may have concerns and fears regarding their own health and that of the people around them through anger and disappointment about the uncer-



tainty of the return of life to “normal”. Some people may experience post-traumatic psychological problems due to high levels of stress or loneliness (6). It is even complicated for health caregivers. Health caregivers who interfere with the pandemic, may be exposed to physical and psychological stress factors that may lead to serious health problems (21). In the study of Bai et al. conducted on the health caregivers during the SARS pandemic, acute stress disorder was observed in 5% of the staff, anxiety was observed in 17% and insomnia was observed in 14%. Furthermore, in 22% of the health caregivers, the feeling of being labelled and rejection were observed since they have worked in a hospital (22). In another study on health caregivers, more traumatic stress was observed in those who had worked in a COVID-19 clinic than those who had not (23). Our hospital continues to provide health services throughout the period of the COVID-19 pandemic actively with all branches. As expected, a significant increase was observed in the mean HAS scores ( $<0.001$ ) and the severity of anxiety ( $<0.001$ ) in the staff of our hospital after they had worked in a COVID-19 clinic.

The COVID-19 pandemic appears to have affected the whole world to a higher extent than any other pandemic. In the study of Lai et al. on health caregivers treating COVID-19 patients, anxiety was reported in 44,6% of the participants (24). In the study of Koksall et al. conducted on health caregivers during the pandemic, 36.9% and 57.5% of the participants were reported to have a score higher than the defined cut-off value for depression and anxiety, respectively, although no psychiatric disease was observed in 90% of the operational room staff (25). Symptoms of stress (29.8%), anxiety (24.1%) and depression (13.5%) were reported in the study of Lu et al. investigating the effects of the COVID-19 pandemic on health professionals (26).

Limited studies are available in the literature investigating the influence of the COVID-19 pandemic on the sexual functions of healthcare workers (27-32). In the cross-sectional study by Culha et al. Conducted with 232 healthcare professionals fighting COVID-19 in pandemic hospitals, the authors have reported that during the pandemic, libido, duration of foreplay, co-

itus frequency decreased, and positions of coitus have changed. The fact that the participants had not been evaluated for anxiety, depression, and sexual functions before the pandemic and the study was conducted when the pandemic had begun to lose its velocity are the limitations of the study (27). Güzel et al. Have reported that compared to pre-pandemic period, health workers' sexual desire level, weekly sexual intercourse frequency, foreplay duration and coitus duration decreased during the ongoing pandemic period. (28). Similarly, in the study by derose et al., 264 healthcare professionals were evaluated by using IIEF-15 and Female Sexual Function Index (FSFI), and sexual desire was reported to decrease in more than 40 % of females and more than 80 % of males (29). Bulut et al. Have detected that post-traumatic stress disorder and ED were significantly higher among actively working healthcare professionals as compared to controls during the pandemic. In addition, being a nurse was reported to be a risk factor for severe ED (30). In the study by Eroglu et al. Evaluating the changes in anxiety among healthcare workers during the pandemic and the effect of anxiety on sexual functions, the scores of IIEF-15 and State Anxiety Inventory-I (STAI-I) were compared at the beginning and the 6th month of the pandemic. The authors have reported that the COVID-19 pandemic negatively affected the sexual life of healthcare workers and sexual function decreased in both sexes, and anxiety severity significantly increased (31). In a systematic review by Bakr et al. Evaluating the changes in erectile functions in healthy controls and health care providers during the pandemic, the COVID-19 pandemic was concluded to be related to increasing ED rates, anxiety and depression increased the severity of ED more particularly in health care providers (32).

Similar to these studies, we have found a significant increase in anxiety and ED levels 4 weeks after beginning to work in COVID-19 clinics. Besides, the increase in anxiety and ED was higher in physicians than in other healthcare professionals (nurses, secretaries, staff). Although our results are similar to those of Culha et al., we consider that evaluating healthcare professionals' erectile functions and anxiety levels before and

after working in COVID-19 clinics made our results more valuable. We also consider that in the study of Bulut et al., it is difficult to determine whether working in COVID-19 clinics or the pandemic itself has led to ED. It may be expected that healthcare professionals may have been affected more by the pandemic as they are more conscious of the pandemic. Showing that anxiety and ED severity increased after beginning to work at COVID-19 clinics makes the results of our study more meaningful. Besides, differently from the study by Bulut et al., we have detected that physicians' anxiety and ED levels increased more than other Healthcare Professionals. We suggest that this results from their having more information about the disease than other healthcare professionals.

The limitations of our study include the small number of participants, not evaluating the sexual quality of life of the partners, and the absence of long-term outcomes.

## CONCLUSION

Our results show that anxiety and ED levels of healthcare professionals working at COVID-19 clinics have increased and physicians are affected more than the other healthcare professionals. Healthcare professionals who are affected by this should be given psychological and sexual consultancy with a multi-disciplinary approach.

## Conflict of Interest

The authors declare to have no conflicts of interest.

## Financial Disclosure

The authors declared that this study has received no financial support.

## Informed Consent

Informed consent was obtained from all individual participants included in the study.

## Ethical Approval

The study was approved by Ethical Committee of Erzurum Regional Training and Research Hospital (Approval Number: 2020/08-93, Date: 20 April, 2020) and written informed consent was received from all

participants. The study protocol conformed to the ethical guidelines of the Helsinki Declaration.

## Author Contributions

Conception and design; AEC, ES, SOD, IK, EO, IHT, IO, Data acquisition; SOD, IK, Data analysis and interpretation; NC, FA, IHT, Drafting the manuscript; AEC, ES, NC, IK, EO, Critical revision of the manuscript for scientific and factual content; AEC, ES, FA, EO, IHT, IO, Statistical analysis; NC, FA, IHT, Supervision; IK, IO.

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