ISSN: 1309-470X
e-ISSN: 1309-5994

ACIBADEM
MEHMET ALİ AYDINLAR ÜNİVERSİTESİ
MMVII

ACIBADEM ÜNİVERSİTESİ

SAĞLIK BİLİMLERİ DERGİSİ

Volume:15, Issue:2, April 2024

Volume: 15, Issue: 2, April 2024

ACIBADEM ÜNİVERSİTESİ

SAĞLIK BİLİMLERİ DERGİSİ

ISSN: 1309-470X
e-ISSN: 1309-5994

YAYIN TÜRÜ
Hakemli Süreli Yayın
(Dergi, yılda 4 sayı olarak Ocak, Nisan, Temmuz, Ekim aylarında yayımlanır)

YAYIN SAHİBİ
Acıbadem Mehmet Ali Aydınlar Üniversitesi Adına
Rektör, Prof. Dr. Ahmet Şahin

EDİTÖR
Prof. Dr. Enis Özyar

EDİTÖR YARDIMCISI
Doç. Dr. Akif Enes Arıkan

DERGİ SEKRETERİ
Yusuf Nar

ADRES / YÖNETİM YERİ
Acıbadem Üniversitesi Sağlık Bilimleri Dergisi
Acıbadem Üniversitesi Tıp Fakültesi Kayışdağı
Cad. No: 32 34752 Ataşehir / İstanbul
Tel : +90 (216) 500 42 96
Faks : +90 (216) 576 50 76
e-posta : editor@acibadem.edu.tr

Acıbadem Üniversitesi Sağlık Bilimleri Dergisi
ULAKBİM TR Dizin, EBSCO, Google Akademik, Crossref, ROAD Açık Erişim Bilimsel Kaynaklar Dizini, Türk Medline, Akademi Endeksi ve Türkiye Atıf Dizini'nde indekslenmektedir.

ACIBADEM ÜNİVERSİTESİ

Volume: 15, Issue: 2, April 2024

HEALTH SCIENCES JOURNAL

ISSN: *1309-470X*
e-ISSN: *1309-5994*

JOURNAL TYPE
Refereed Periodicals
(The journal is published four times a year in January, April, July and October)

JOURNAL OWNER
On behalf of Acıbadem Mehmet Ali Aydınlar University
Rector, Prof. Dr. Ahmet Şahin

EDITOR
Prof. Dr. Enis Özyar

DEPUTY EDITOR
Assoc. Prof. Akif Enes Arıkan

SECRETARY
Yusuf Nar

ADDRESS / EDITORIAL OFFICE
Acıbadem University Health Sciences Journal Acıbadem University, School of Medicine Kayışdağı Cad. No: 32 34752 Ataşehir / İstanbul
Phone : +90 (216) 500 42 96
Fax : +90 (216) 576 50 76
e-mail : editor@acibadem.edu.tr

Acıbadem University Health Sciences Journal
İndexed in ULAKBİM TR Dizin, EBSCO, Google Scholar, Crossref, ROAD Directory of Open Access Scholarly Resources, Turkish Medline, Academi index ve İndex of Academic Journals and Türkiye Atıf Dizini.

ACIBADEM ÜNİVERSİTESİ
SAĞLIK BİLİMLERİ DERGİSİ

Volume: 15, Issue: 2, April 2024

Contents / İçindekiler

Research Articles / Araştırma Makaleleri

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/10.31067/acusaglik.1347853

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Neurosicence / Sinirbilim

Gender-Specific Effects of Chronic Y-27632 Administration on Spike-And-Wave Discharges in Genetic Absence Epilepsy Rats

Melis Yavuz[1,2], İsmail Ata Yüceel[2], Görkem Gökkaya[2], Deniz Athena Tekdemir[2], Gül Batum[2], Berfe Bengisu Aydin[2], Filiz Onat[2,4,5]

[1]Department of Pharmacology, Faculty of Pharmacy, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey

[2]Department of Medical Pharmacology, Faculty of Medicine, Marmara University, Istanbul, Turkey

[3]Faculty of Medicine, Marmara University, Istanbul, Turkey

[4]Epilepsy Research Centre (EPAM), Marmara University, Istanbul, Turkey

[5]Department of Medical Pharmacology, Faculty of Medicine, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey

Dr. Melis YAVUZ
0000-0003-1250-9755

İsmail Ata YÜCEEL
0009-0000-9939-8140

Görkem GÖKKAYA
0000-0002-2570-4552

Deniz Athena TEKDEMİR
0009-0006-7996-3484

Gül BATUM
0009-0004-2541-0417

Berfe Bengisu AYDIN
0009-0004-5859-5219

Prof. Dr. Filiz Yılmaz Onat
0000-0003-0680-4782

Correspondence: Dr. Melis Yavuz
Department of Pharmacology
Acibadem Mehmet Ali Aydinlar University
Faculty of Pharmacy
Kayışdağı Cad. No:32 Ataşehir,İstanbul, Turkey
Phone: +90 216 500 43 12
E-mail: melis.yavuz@acibadem.edu.tr

Received: 25.08.2023
Accepted: 29.04.2024

ABSTRACT

Purpose: The acute intracerebroventricular (i.c.v.) injection of a Rho kinase inhibitor Y-27632 has beendemonstrated to reduce the spike-and-wave discharges (SWDs) in male GAERS (Genetic Absence Epilepsy Rats from Strasbourg) by our previous study. The purpose of this research is to determine the chronic use of five days will effect the SWDs of absence epilepsy in female GAERS and to compare the expression of SWDs between female and male GAERS.

Methods: Five female and male GAERS (150-350 g) were used in experiments. Stereotaxic surgery was performed to insert EEG recording electrodes over the fronto-parietal cortices. Female GAERS were injected with Y-27632 intraperitoneally over the five days,and compared to the baseline EEG of the same animals. SWD characteristics were analyzed using EEG recordings and analyzed.

Results: Total and mean SWD duration, and the number of SWDs did not significantly differ female GAERS, received Y-27632. Although a trend of reduced total duration was observed in female rats, it was not statistically significant. A significant difference was observed for the mean duration and number of SWDs between the female and male GAERS, ($p<0.05$). While the mean duration for SWDs is shorter in duration in females ($p=0.01$), the number of SWDs were more in females in comparison to male GAERS ($p=0.02$).

Conclusion: Although some outcomes did not reach statistical significance, trends suggest potential gender-related differences in SWD response to Y-27632 or SWD expression. The administration may not be as effective in intraperitoneal route as in i.c.v. Further experiments can be performed by changing the route of administration.

Keywords: GAERS, SWDs, ROCK, Y27632, female

ÖZET

Amaç: Bir Rho kinaz inhibitörü Y-27632'nin akut intraserebroventriküler (i.s.v.) enjeksiyonunun, erkek GAERS'lerde (Strasbourg'dan Genetik Absans Epilepsi Sıçanlar) diken-ve-dalga deşarjları (DDD'ler) azalttığı gösterilmiştir. Bu araştırmanın amacı, dişi GAERS'lerde, beş günlük kronik kullanımın absans epilepsisinin DDD'leri üzerindeki etkisini belirlemek, dişi ve erkek GAERS'ler arasındaki DDD'leri karşılaştırmaktır.

Yöntem: Deneylerde beş adet dişi ve erkek GAERS (150-350 g) kullanıldı. EEG kayıt elektrotlarının fronto-parietal kortekslere yerleştirilmesi için stereotaksik cerrahi uygulandı. Dişi GAERS'lere beş gün boyunca intraperitoneal olarak Y-27632 enjekte edildi ve aynı hayvanların bazal EEG'leri ile karşılaştırıldı. DDD'lerin özellikleri EEG kayıtları kullanılarak analiz edildi.

Bulgular: DDD'lerin toplam ve ortalama süresi ve sayısı, Y-27632 alan dişi GAERS'de anlamlı farklılık göstermedi. Dişi sıçanlarda toplam DDD süresinde azalma eğilimi görülmesine rağmen bu istatistiksel olarak anlamlı değildi. Dişi ve erkek GAERS'ler arasında DDD'lerin ortalama süresi ve sayısı açısından anlamlı bir fark gözlendi ($p<0,05$). Dişi GAERS'lerde ortalama DDD süresi daha kısa iken ($p=0,01$), DDD sayısı dişilerde erkeklere göre daha fazlaydı ($p=0,02$).

Sonuç: Sonuçlar istatistiksel anlamlılığa ulaşmasa da, Y-27632'ye verilen DDD yanıtında cinsiyete bağlı potansiyel farklılıklar olduğunu göstermektedir. Olasılıkla intraperitoneal yol, i.s.v. kadar etkili olmayabilir. Uygulama yolu değiştirilerek daha ileri deneyler planlanmaktadır.

Anahtar Kelimeler: GAERS, DDD'ler, ROCK, Y27632, dişi

Generalized absence seizures are a type of non-convulsive seizure characterized by unconsciousness and bilateral spike-and-wave discharges (SWDs) on EEGs (1). These seizures are prevalent across various idiopathic generalized syndrome categories and are often studied using animal models to understand their underlying mechanisms and develop relevant treatments (2, 3). Genetic rat models like GAERS and WAG/Rij rats are highlighted as valuable tools for replicating the persistent clinical manifestations of absence epilepsy, enhancing the accuracy of research outcomes compared to pharmacological models (4, 5). Many different mechanisms are discussed to underlie the pharmacology and pathophysiology of the seizures in the absence epilepsy (6-11).

We specifically investigated Rho kinase inhibitors in our previous studies. The role of RhoA and Rho-kinase in dendrite development and branching, as well as their involvement in neuronal cell survival and glutamate transmission, is well-known (12). The Rho kinase inhibitor Y-27632 is mentioned for its potential in preventing glutamate-induced cell death (13). Fasudil and Y-27632 have been shown to be protective as well, on retinal excitotoxicity caused by NMDA-induced damage, focusing on their influence on RhoA and ROCK2 levels and cell survival (14). In epilepsy research, Y-27632 and fasudil decreased myoclonic jerks, clonic convulsions, tonic hindlimb extensions, tonic convulsion index, and recovery latency while increasing Rho translocation in brain homogenates of PTZ-treated mice (15). Previously we have shown that single systemic dose of Y-27632 reduced absence seizure duration, while fasudil lowered seizure frequency (16). Local brain administration exhibited a comprehensive suppressive impact on total seizure duration, seizure count, and average individual seizure length with Rho kinase inhibitors, but intraperitoneal administration did not show that strong results (16).

Sex differences are observed not only in humans but also in animal models like rats (17). Neglecting to consider both sexes in research can lead to incomplete understanding of drug effects and cognitive capacities, therefore the research involving both genders are encouraged to prevent possible adverse effect in a certain population (18). A study by Prendergast et al. highlights the importance of including both sexes for valid and applicable research outcomes (19). Certain types of epilepsy subtypes also might have varying susceptibilities based on gender (20, 21). Neglecting the sex differences in the research called scientists to call the National Institutes of Health into action, to prevent adverse effects of the drugs faced mostly among women by being inclusive in the animal research in terms of including female gender as well (18).

Existing literature suggests that different outcomes such as histopathological changes, behavioral effects, molecular responses, and the development of epilepsy might be influenced by seizures during development in ways that are specific to sex, age, and brain regions (22). The sex differences in these genetic absence epilepsy models have also been discussed and although no differences of seizure expressions were found (4), hormonal changes during pregnancy, the effect of sex hormones as well as epidemiological data shows the gender may influence the possible pharmacotherapies (23). Therefore, in this study, we aimed to investigate if the chronic intraperitoneal administration of Rho kinase inhibitor Y-27632 in female rats will show differential results in terms of SWD expression in comparison to male GAERS rats, as well as to investigate the baseline expression of SWDs between female and male GAERS.

Material and Methods

Animals and experimental design

The experimental procedures were conducted on adult female and male Genetic Absence Epilepsy Rats from Strasbourg (GAERS) rats, aged 3 to 4 months and weighing between 150 and 350 grams (n=5;5= 10), sourced from the breeding colony of the Department of Pharmacology and Clinical Pharmacology at Marmara University School of Medicine. Additionally, male adult Wistar rats, derived from male and female rats with previously recorded EEGs demonstrating the absence of spike-and-wave discharges (SWD) activity, were employed. They were obtained from the Experimental Research Animals Unit of Marmara University Faculty of Medicine (DEHAMER).

The rats were housed individually in cages within a temperature-regulated environment set at 21 ± 3°C, with a 12-hour light/dark cycle (lights on at 8 a.m.). Adequate provisions of food and water were available ad libitum to the rats throughout the study. All experimental protocols involving animals were subject to approval by the Ethical Committee for Experimental Animals at Marmara University, with the assigned protocol number 28.2017. MAR. These procedures were conducted in compliance with the guidelines outlined in the EU Directive 2010/63/EU governing animal experimentation. The group name for the basal recordings from the female and male rats were tagged as; Baseline-FM and Baseline-M; respectively. And the group name for the Y27632-injected rats were tagged as; Y27632-FM.

Stereotaxic surgery

The animals underwent anesthesia induction using ketamine (100 mg/kg, intraperitoneal, Alfamine 10%; Alfasan International B.V.) and xylazine (10 mg/kg, intraperitoneal, Alfazyne 2%; Alfasan International B.V.). Subsequently, they were securely positioned within a stereotaxic frame (Stoelting Model 51600, Stoelting Co., Illinois, USA). A longitudinal incision was carefully made on the skull to expose the underlying tissue. Four stainless steel screws, affixed with insulated wires, were bilaterally implanted onto the frontoparietal cortex to facilitate cortical EEG recordings. Each cortex recorded is represented by the potential difference between the two electrodes on the same side, for instance the potential difference of the right parietal electrode and the right frontal electrode is the right cortex recording. The connections between the electrodes and the insulated wires were established, leading to a micro connector designed for the purpose of EEG data acquisition. To ensure stability and proper positioning, both the electrodes and the wires were protected by dental acrylic and affixed firmly to the skull.

EEG recordings, drug injections and analysis

After the stereotaxic surgery, the animals were allowed to recover for a week. One week later, 3 h of baseline activity was recorded on EEG (09:00-12:00). Two days later the chronic injections began, the Rho kinase inhibitor Y-27632 was purchased from (Tocris Bioscience (UK). The dose of 0.3 mg/kg was dissolved in saline and injected according to the body weight of each animal.

On the fifth day following the last injection 3 h EEG recordings from the GAERS was recorded. The Y27632 was injected to female rats twice daily for the 5 days, and the last day following injections the EEG recordings were performed. SWD complexes, which are usually identified if the duration is longer than 1 s, with a train of sharp spikes and subsequent slow waves (7-11 Hz) and the amplitude of at least twice the background amplitude of the EEG, were analyzed. EEG was amplified through a BioAmp ML 136 amplifier, with an anti-aliasing filter set at 0.1-125 Hz and digitized at a sampling rate of 1,000 Hz. The data were analyzed using Chart v7 program (PowerLab 8/35, ADI Instruments, Oxfordshire, UK).

Statistical analysis

All statistical analyses were performed with GraphPad Prism version 9.1.0 (GraphPad Software, San Diego, USA). For statistical analysis of the EEG data in the female GAERS that received Y27632, the total number of SWDs, mean duration of each individual; as well as the number of SWDs, a paired t-test was conducted to assess the significance of the observed differences. The obtained t-value, degrees of freedom (df) and the corresponding two-tailed p-value was provided, p-value less than 0.05 has been shown with an asterisk (*). For the comparison of the female and male baseline SWD parameters of GAERS groups an unpaired t-test (two-tailed) was performed. The data is represented as t(df) = t-value, p = p-value for t-tests.

Results

The effect of intraperitoneal injection of Y-27632 on the total duration of SWDs in female GAERS groups

The total duration of SWDs (s) in the groups of Baseline-FM and Y27632-FM showed no statistical significance, although closer to p<0.5 value. The paired t-test comparing baseline EEG and the Y-27632 injected GAERS, showed total duration of the SWDs in the female rats showed overall less duration although statistically not significant; t(4) = 1.75, p = 0.08 (Fig 1).

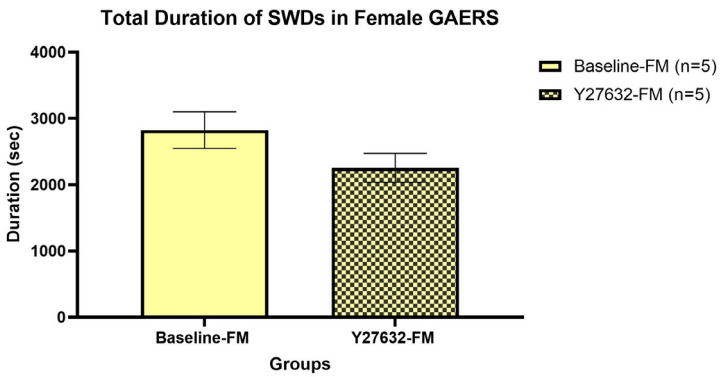


Figure 1: Impact of Intraperitoneal Y-27632 Injection on Total SWD Duration in Female GAERS Rats. *The graph depicts assessing the effect of intraperitoneal injection of Y-27632 on the total duration of SWDs within female GAERS groups. Analysis of the total SWD duration (s) in the Baseline-FM and Y27632-FM groups did not yield statistically significant differences, although the results approached a p-value of less than 0.5.*

The effect of intraperitoneal injection of Y-27632 on the mean duration and the number of SWDs in female GAERS groups

The mean duration of SWDs (s) in the groups showed no statistical significant difference. Y27632-FM group expressed less duration for each individual seizures in comparison to the Baseline-FM (t(4) = 0.2, p = 0.85; p=0.01; Fig 2A). On the other hand, the number of SWDs in the female groups showed decreased number of SWDs (t(4) = 1.85, p = 0.13; Fig 2B).

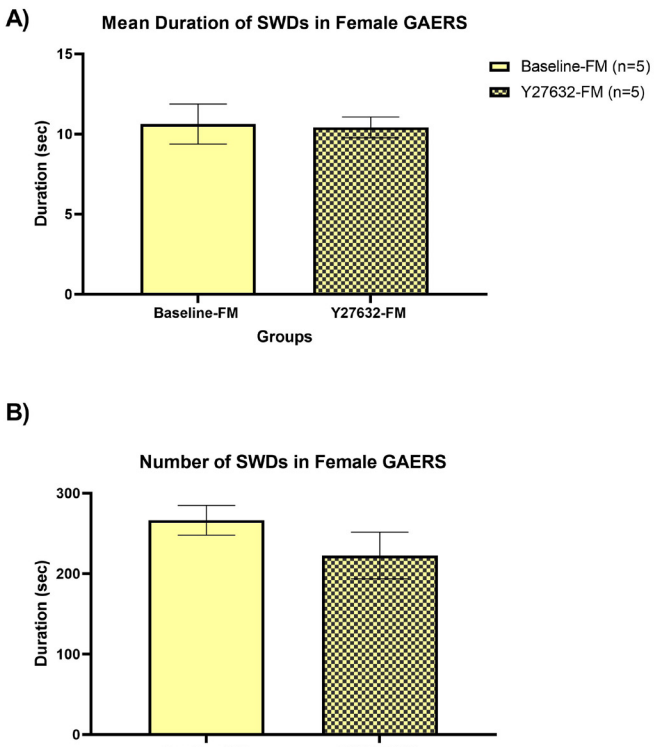


Figure 2: Effect of Intraperitoneal Y-27632 Injection on Mean SWD Duration and SWD Numbers in Female GAERS Rats. (A) The number of SWDs within the female groups indicated an elevated count, although the difference did not achieve statistical significance. (B) Analysis of the mean SWD duration (s) across the groups revealed no statistically significant differences. The Y27632-FM group exhibited less duration for individual seizures in contrast to the Baseline-FM group. Data are presented as mean ± standard error of the mean (SEM). *p < 0.05, ns = not significant.

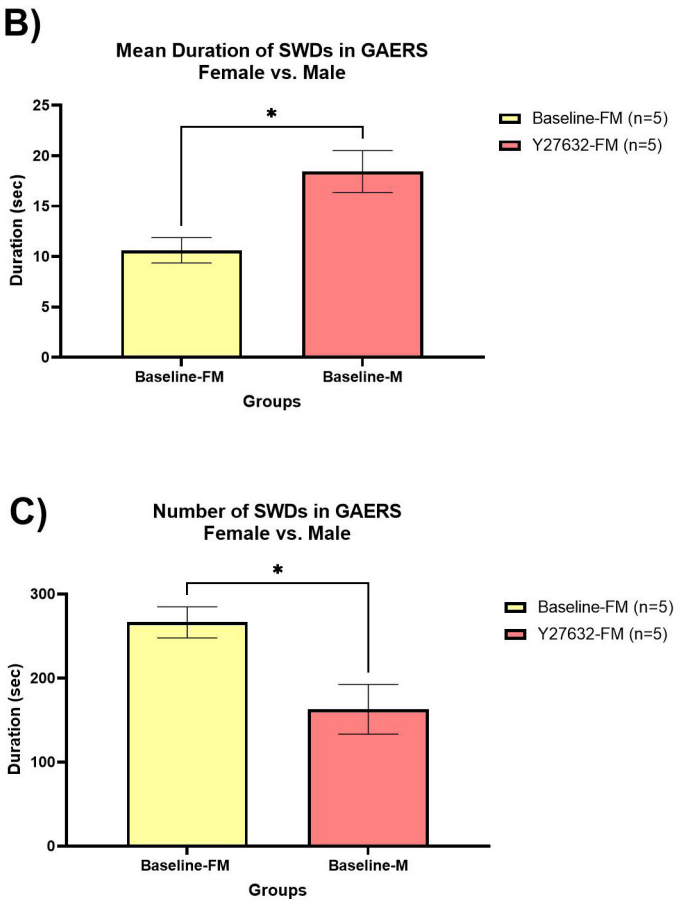
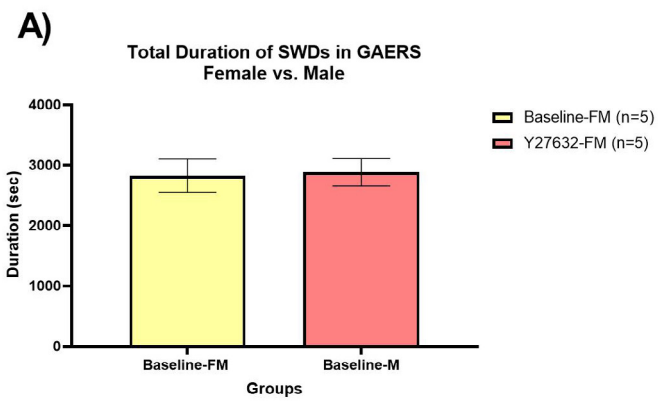


Figure 3: Comparison of SWD Parameters in Female and Male GAERS Rats. (A) Total duration of SWDs did not show a statistically significant difference between female and male GAERS rats. (B) Mean SWD duration, with females displaying significantly shorter mean durations compared to males. (C) the number of SWDs exhibited significant variation between female and male GAERS rats, with females manifesting a greater number of SWDs relative to males. Data are presented as mean ± standard error of the mean (SEM). *p < 0.05, **p < 0.01, ns = not significant.

The SWD parameters between the female and male GAERS groups



An unpaired t-test was conducted to assess the significance of the total duration, mean duration and number of SWDs between female and male GAERS baseline SWDs. Although there was no statistically significant difference for the total duration ($t(8) = 1.62$, $p = 0.14$; Fig 3A), there were differences between the female and male GAERS for the mean duration and number of SWDs ($p < 0.05$). While the mean duration for SWDs is shorter in duration in females ($t(8) = 3.23$, $p = 0.01$; Fig 3B), the number of SWDs were in females in comparison to male GAERS ($t(8) = 2.97$, $p = 0.02$; Fig 3C).

Discussion

The present study aimed to investigate the potential differential effects of chronic intraperitoneal administration of the Rho kinase inhibitor Y-27632 on SWD parameters in the female GAERS in comparison to their own baseline EEG. As well as to study if there are any gender-based differences between the baseline SWD parameters of female and male GAERS. Previously we have shown that the intracranial administration of these Rho kinase inhibitors; Fasudil and Y-27632 (16), inhibits SWD parameters such as total duration, mean duration and number of SWDs in male GAERS.

Our previous study was not inclusive in terms of gender. In light of this background, the study used GAERS rats of both sexes to explore the impact of Y-27632 administration on SWD expression. The results indicated that the total duration of SWDs did not show statistically significant differences between the experimental groups, although female rats exhibited a trend towards reduced SWD duration. Most literature on the pharmacological and neurological research on the epileptic models revolves around male gender (24, 25), except few studies (26, 27). The issues around the hormonal influence of SWDs in adulthood, as well as menstrual cycles have been an issue related to the research on the animals in our previous studies which we only implemented on male GAERS (10, 11, 26, 28, 29). The finding of no significant differences in terms of seizure expression shows that female GAERS can also be implemented as a consistent model for absence epilepsy research.

Furthermore, in this study, our results showed that although there are no statistically significant differences in the overall expression of the total duration between the female and male GAERS, the mean duration and the number of SWDs were different between the groups. Although the average duration of SWDs is briefer in females, there exists a higher count of SWDs in females as opposed to male GAERS. This observation raises the possibility of gender-associated variations in the manifestation of SWD characteristics. Nevertheless, additional investigations are required, encompassing diverse colonies of GAERS and other genetic models of absence epilepsy such as Wistar Albino Glaxo/Rijswijk (WAG/Rij), to gain a deeper understanding of these potential gender-related distinctions.

In conclusion, this study contributes to the growing body of knowledge regarding gender-specific responses to epilepsy treatment. However, it is important to interpret these results with caution and consider potential confounding factors. The investigation into the effects of Rho kinase inhibitor Y-27632 on SWD expression in GAERS rats provides insights into potential sex-related differences in response to this pharmacological intervention. While some results did not achieve statistical significance, the trends observed underscore the importance of considering gender-based factors in epilepsy research and treatment. Further investigations with larger sample sizes and extended experimental durations could provide a more comprehensive understanding of the intricate relationship between gender, pharmacological interventions, and the absence epilepsy outcomes.

Conclusion

This study sheds light on potential gender-related differences in the response to chronic intraperitoneal administration of the Rho kinase inhibitor Y-27632 in female GAERS. While certain outcomes did not reach statistical significance, the trends observed suggest the existence of gender-based variations in SWD characteristics and response to pharmacological intervention. In addition, this study underscores the importance of considering gender-related factors in epilepsy research and treatment strategies. Further investigations involving larger cohorts and extended experimental durations are warranted to comprehensively unravel the intricate interplay between gender, pharmacological interventions, and absence epilepsy outcomes.

Declarations

Funding

This study had no external funding.

Conflicts Of Interest

The authors declare that they have no conflicts of interest.

Ethics Approval

This study was approved by the Ethical Committee for Experimental Animals at Marmara University, with the assigned protocol number 28.2017.MAR.

Availability Of Data And Material

Data are available upon request from the corresponding author.

Authors' Contributions

MY and FO conceptualized and designed the study. MY, GG, DAT and İAY organized the database, performed the statistical analysis, and wrote the first draft of the manuscript. MY, İAY, GG, DAT, GB, and BBA performed the stereotaxic surgery, drug injections and EEG recordings, analysis. MY, FO and İAY contributed to the manuscript's revision and read and approved the submitted version. All authors approved the final version of the manuscript. We want to thank for our technician Nurettin Demirci for his help for the sustaining of GAERS breeds.

References

1. Panayiotopoulos CP, Chroni E, Daskalopoulos C, et al. Typical absence seizures in adults: clinical, EEG, video-EEG findings and diagnostic/syndromic considerations. J Neurol Neurosurg Psychiatry. 1992;55(11):1002-8.
2. Loscher W. Animal Models of Seizures and Epilepsy: Past, Present, and Future Role for the Discovery of Antiseizure Drugs. Neurochem Res. 2017;42(7):1873-88.
3. Löscher W, Ferland R, Ferraro T. Strain effects on expression of seizures and epilepsy. In: Pitkänen A, Buckmaster P, Galanopoulou AS, Moshé SL, editors. Models of seizures and epilepsy. 2nd edition. San Diego, California: Elsevier; 2017. p. 21-38.
4. Coenen AM, Van Luijtelaar EL. The WAG/Rij rat model for absence epilepsy: age and sex factors. Epilepsy Res. 1987;1(5):297-301.
5. Marescaux C, Vergnes M. Genetic Absence Epilepsy in Rats from Strasbourg (GAERS). The Italian Journal of Neurological Sciences. 1995;16(1):113-8.
6. Reid CA, Phillips AM, Petrou S. HCN channelopathies: pathophysiology in genetic epilepsy and therapeutic implications. Br J Pharmacol. 2012;165(1):49-56.
7. Cain SM, Tyson JR, Choi HB, et al. CaV 3.2 drives sustained burst-firing, which is critical for absence seizure propagation in reticular thalamic neurons. Epilepsia. 2018;59(4):778-91.
8. Gülhan Aker R, Tezcan K, et al. Localized cortical injections of ethosuximide suppress spike-and-wave activity and reduce the resistance to kindling in genetic absence epilepsy rats (GAERS). Epilepsy Res. 2010;89(1):7-16.
9. Dezsi G, Ozturk E, Stanic D, et al. Ethosuximide reduces epileptogenesis and behavioral comorbidity in the GAERS model of genetic generalized epilepsy. Epilepsia. 2013;54(4):635-43.
10. Yavuz M, Aydin B, Carcak N, et al. Atipamezole, a specific alpha2A antagonist, suppresses spike-and-wave discharges and alters Ca(2(+)) /calmodulin-dependent protein kinase II in the thalamus of genetic absence epilepsy rats. Epilepsia. 2020.
11. Yavuz M, Akkol S, Onat F. ALPHA-2A ADRENERGIC RECEPTOR (α2AR) ACTIVATION IN GENETIC ABSENCE EPILEPSY: AN ABSENCE STATUS MODEL? Authorea. 2022.
12. Nourbakhsh K, Yadav S. Kinase Signaling in Dendritic Development and Disease. Front Cell Neurosci. 2021;15:624648.
13. Jeon BT, Jeong EA, Park SY, et al. The Rho-kinase (ROCK) inhibitor Y-27632 protects against excitotoxicity-induced neuronal death in vivo and in vitro. Neurotoxicity research. 2013;23(3):238-48.
14. Kitaoka Y, Kitaoka Y, Kumai T, et al. Involvement of RhoA and possible neuroprotective effect of fasudil, a Rho kinase inhibitor, in NMDA-induced neurotoxicity in the rat retina. Brain Res. 2004;1018(1):111-8.
15. Inan S, Büyükafşar K. Antiepileptic effects of two Rho-kinase inhibitors, Y-27632 and fasudil, in mice. Br J Pharmacol. 2008;155(1):44-51.
16. Çarçak N, Yavuz M, Eryiğit Karamahmutoğlu T, et al. Suppressive effect of Rho-kinase inhibitors Y-27632 and fasudil on spike-and-wave discharges in genetic absence epilepsy rats from Strasbourg (GAERS). Naunyn Schmiedebergs Arch Pharmacol. 2018;391(11):1275-83.
17. Becker JB, Koob GF. Sex Differences in Animal Models: Focus on Addiction. Pharmacol Rev. 2016;68(2):242-63.
18. Clayton JA, Collins FS. Policy: NIH to balance sex in cell and animal studies. Nature. 2014;509(7500):282-3.
19. Prendergast BJ, Onishi KG, Zucker I. Female mice liberated for inclusion in neuroscience and biomedical research. Neurosci Biobehav Rev. 2014;40:1-5.
20. Christensen J, Kjeldsen MJ, Andersen H, et al. Gender differences in epilepsy. Epilepsia. 2005;46(6):956-60.
21. Reddy DS. The neuroendocrine basis of sex differences in epilepsy. Pharmacology Biochemistry and Behavior. 2017;152:97-104.
22. Akman O, Moshé SL, Galanopoulou AS. Sex-specific consequences of early life seizures. Neurobiol Dis. 2014;72:153-66.
23. van Luijtelaar G, Onat FY, Gallagher MJ. Animal models of absence epilepsies: what do they model and do sex and sex hormones matter? Neurobiol Dis. 2014;72:167-79.
24. Budde B, Maksimenko V, Sarink K, et al. Seizure Prediction in Genetic Rat Models of Absence Epilepsy: Improved Performance through Multiple-Site Cortico-Thalamic Recordings Combined with Machine Learning. eNeuro. 2022;9(1).
25. Islam MR, Abdullah JM. Age-dependent Electroencephalographic Differences in the Genetic Absence Epilepsy Rats from Strasbourg (GAERS) Model of Absence Epilepsy. The Malaysian journal of medical sciences : MJMS. 2014;21(Spec Issue):34-40.
26. Yavuz M, Albayrak N, Özgür M, et al. The effect of prenatal and postnatal caffeine exposure on pentylentetrazole induced seizures in the non-epileptic and epileptic offsprings. Neurosci Lett. 2019;713:134504.
27. Powell KL, Tang H, Ng C, et al. Seizure expression, behavior, and brain morphology differences in colonies of Genetic Absence Epilepsy Rats from Strasbourg. Epilepsia. 2014;55(12):1959-68.
28. Karakaya FB, Yavuz M, Sirvanci S. Histological analysis of the effects of thymoquinone on testicular damage in pentylenetetrazole-induced temporal lobe epilepsy model. Andrologia. 2021;53(10):e14130.
29. Ozmen B, Ciftci RK, Yavuz M, et al., editors. Automatic detection of seizure activity from EEG recordings of genetic rat model of absence epilepsy. SIU 2021 - 29th IEEE Conference on Signal Processing and Communications Applications, Proceedings; 2021.

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/10.31067/acusaglik.1318875

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Infectious Diseases / Bulaşıcı Hastalıklar

Evaluation of Oxygen Consumption at Maximal Workload in Cases of Post-COVID-19 Syndrome

Sule Ceylan[1]

[1]University of Health Sciences Gaziosmanpasa Training and Research Hospital, Department of Nuclear Medicine Osmanbey Street Istanbul/ Turkey

Sule Ceylan
0000-0003-1485-3701

Correspondence: Sule Ceylan
University of Health Sciences Gaziosmanpasa Training and Research Hospital, Department of Nuclear Medicine Osmanbey Street Istanbul/ Turkey
Phone: +90 535 929 73 11
E-mail: ceylansule2003@gmail.com

Received: 23.06.2023
Accepted: 15.12.2023

ABSTRACT

Objective: Oxygen consumption at maximum workload is a physiological criterion expressing aerobic capacity. We aimed to evaluate whether aerobic capacity is affected in post-COVID-19 syndrome by comparing oxygen consumption and heart rate index values in patients whose complaints continued after the acute phase of SARS-CoV2 disease passed.

Methods: 27 patients who underwent scintigraphy to be evaluated for coronary artery disease between January and March 2021 were included in the study. Our patients underwent treadmill exercise using the Bruce Protocol procedure. Patients achieved 100% of heart rate calculated using the 220-age formula. Oxygen consumption and heart rate index values at maximum workload values were compared in the same patient group before and after COVID-19 infection.

Results: 11 of the cases (40.7%) were women. The median age of the patients was 53 (49-57) years. In our patients with post-COVID-19 syndrome, oxygen consumption and heart rate index values at the maximum workload values calculated before COVID-19 infection were higher than those calculated later. Oxygen consumption in the same patient group is as follows; It was calculated as 43 (28-44) and 37 (26-38) before and after COVID infection (p:0.0005). Heart rate index values were calculated as 2.5 (2.4-2.6) and 2.4 (2.3-2.6) (p:0.0005).

Conclusion: In the presence of post-COVID-19 syndrome, there is a decrease in aerobic capacity. Determining the cause of complaints will allow us to develop prevention and treatment methods. In the presence of maximum workload, oxygen consumption and heart rate index values can be used in the monitoring of patients with post-COVID-19 syndrome.

Key Words: heart rate, exercise test, post-acute COVID-19 syndrome, radionuclide imaging

ÖZET

Amaç: Maksimum iş yükünde oksijen tüketimi aerobik kapasiteyi ifade eder ve dayanıklılığın önemli bir fizyolojik kriteridir. Post-COVID-19 sendromunda SARS-CoV2 hastalığının akut fazı geçtikten sonra bazı şikayetler en az 12 hafta devam etmektedir. Maksimum iş yükü varlığında oksijen tüketimi ve kalp atım hızı indeks değerlerini karşılaştırarak, post-COVID-19 sendromda aerobik kapasitenin etkilenip etkilenmediğini doğrulamayı amaçladık.

Yöntemler: Çalışmaya Ocak-Mart 2021 tarihleri arasında göğüs ağrısı ve nefes darlığı şikayetleri nedeniyle koroner arter hastalığı açısından değerlendirilen ve miyokard perfüzyon sintigrafi tetkiki yapılan 27 hasta dahil edildi. Hastaların 11'i kadındı. Hastalarımıza Bruce Protokolü prosedürü kullanılarak koşu bandı egzersizi uygulandı. Hastalarımızın tamamı 220-yaş formülü kullanılarak hesaplanan kalp hızının %100'üne ulaştı. Aynı hasta grubunda COVİD-19 enfeksiyonu öncesi ve sonrasında maksimum iş yükü varlığında oksijen tüketimi ve kalp atım hızı indeksi değerleri karşılaştırıldı.

Bulgular: Olguların 11'i (%40,7) kadındı. Hastaların ortanca yaşı 53 (49-57) yıl idi. Post-COVİD-19 sendromlu hastalarımızda, COVİD-19 enfeksiyonu öncesinde hesaplanan maksimum iş yükünde oksijen tüketimi ve kalp atım hızı indeksi değerleri, daha sonra hesaplananlara göre daha yüksekti. Aynı hasta grubunda maksimum iş yükünde oksijen tüketimi sırasıyla; COVİD enfeksiyonu öncesi ve sonrası 43 (28-44) ve 37 (26-38) olarak hesaplandı (p:0,0005). Kalp atım indeksi değerleri 2,5 (2,4-2,6) ve 2,4 (2,3-2,6) olarak hesaplandı (p:0,0005).

Sonuç: Post-COVID-19 sendromu varlığında aerobik kapasitede azalma mevcuttur. Şikayetlerin sebebini belirlemek, önleme ve tedavi yöntemlerini geliştirmemize olanak sağlayacaktır. Maksimum iş yükü varlığında oksijen tüketimi ve kalp atım hızı indeksi değerleri, post-COVID-19 sendromlu hastaların takibinde kullanılabilir. Bu konuda ileriye dönük çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: kalp hızı, egzersiz testi, post-akut COVID-19 sendromu, radyonuklit görüntüleme

Maximal aerobic capacity is a frequently used guiding parameter when determining the ability to sustain effort. Oxygen consumption at maximal workload (VO2max) is one of the important physiological criterion of endurance that has been used for many years and expresses aerobic capacity (1). Bruce Protocol (BP) is a treadmill test protocol that allows the subject to reach VO2max in a short time due to the increase in incline and speed together (Table 1) (2). Clinical entity-defined related studies are ongoing (3). In post-COVID syndrome (PCS), some complaints persist for at least 12 weeks after the acute as PCS has approximately 200 different symptoms and the phase of SARS-CoV2 disease has passed (4-5). Patients with COVID-19 typically present with a respiratory infection, however cardiac manifestations are also common. Among the possible causes of myocardial damage in COVID-19 patients; are stress cardiomyopathy, hypoxic injury, vasculitis, endothelitis, acute cor pulmonale, myocarditis, and cytokine storm (6). Patients may present with palpitations and chest pain (7). Elevated cardiac troponin levels are a generally accepted marker for determining myocardial damage (7). Patients with mildly symptomatic COVID-19 have a lower frequency of troponin elevation (8). In a few patients with COVID-19, myocarditis has been histologically confirmed, but the viral genome has not been identified in the myocardium (9). The possibility of immune myocarditis has been suggested but unproven (10). We compared pre-pandemic and post-pandemic cardiac parameters in our patients who were investigated for coronary artery disease (CAD) and subsequently diagnosed with PCS. In our retrospective study, myocardial perfusion scintigraphy was performed on our patients and they were evaluated for CAD. This study aimed to verify whether aerobic capacity is affected in PCS by comparing VO2max values and heart rate index (HRI) values.

Material-Method

Between January and March 2021, 27 patients who underwent scintigraphy to evaluate myocardial perfusion in terms of coronary artery disease due to chest pain were included in the study. Eleven of the patients were female. Although all of our patients were previously positive for COVID-19 PCR, PCR tests became negative between June and August 2020. In our patients, who survived the COVID-19 infection with mild symptoms without being hospitalized, the complaints of significant shortness of breath and whole body and left shoulder pain developed after COVID-19 continued. Effort myocardial perfusion scintigraphy (MPS) was performed in all patients 32-35 weeks after the PCR test turned negative, in line with cardiac indications (2). All 27 patients underwent their first stress myocardial perfusion scintigraphy performed for the indication in 2019. 11 female patients had recurrent syncope with no known cause, and 16 male patients had recurrent chest pain and ST changes on the exercise ECG. Before the test, detailed anamnesis was performed on our patients. Our patients did not have bundle branch blocks or pacemakers. 27 patients included in the study had no history of chronic heart disease, chronic lung disease, or chronic disease. No history of chronic drug use. None of the 27 patients had diabetes mellitus, hypertension, hypercholesterolemia, smoking, obesity, and other cardiovascular risk factors. Some patients had a family history of coronary heart disease. The data of the patients are summarized in Table 2. None of the 27 patients had hospitalization or intensive care indications during COVID-19 infection. No elevation was found in inflammation markers for infection. MPS indication was made with these findings. Treadmill exercise was applied to our patients using the BP procedure (Table 1). All of our patients reached 100% of the cardiac rate calculated with the 220-age formula, and the test was terminated because of burnout. ECG monitoring was performed during the test and no significant ECG changes were found. Our patients had no history of chronic drug use or chronic disease. Our patients cut out foods containing methylxanthines 12 h beforehand. Imaging was performed by the guidelines (2). A dose of 8-12 mCi was administered for stress imaging and 24-36 mCi for rest imaging. The first stress images were recorded after 20-40 min. A low-energy high-resolution collimator was used. Imaging was performed in the supine position. A 64x64 matrix was used. SPECT image quality was increased by reducing noise with appropriate filtering (11). (Figure 1). Iterative reconstruction methods were used. Thus, attenuation, scattering, and blurring were corrected. MPS images were evaluated quantitatively according to the 17-segment model (12). (Figure 2). Mediso Anyscan-S dual-headed SPECT gamma camera, PC-based TEPA brand treadmill and stresswin software were used. Qualitative and quantitative data were obtained from the SPECT images. None of our 27 patients had evidence of perfusion defect in the gated MPS examination. (Figure 1). In our patients who were clinically accepted as PCS, the quantitative data calculated from two scintigraphic images and parameters showing aerobic capacity such as VO2max in patients with maximum effort according to BP were compared. The duration (T) of the patient's exertion was determined according to BP. There are some formulas for the VO2max calculation (13).

In patients whose metabolic equivalent (MET) was determined according to BP, this value was multiplied by 3.5 to obtain VO2max (13). HRI value is the ratio of exercise heart rate to resting heart rate (13). Information and consent forms were obtained from the patients. Our retrospective study was approved by Gaziosmanpasa Training and Research Hospital Ethics Committee with 72 numbers on 08.06.2022.

Table -1: Bruce Protocol

Stage	Duration (min)	Speed (MPH)	Grade (%)
1	3	1.7	10
2	3	2.5	12
3	3	3.4	14
4	3	4.2	16
5	3	5	18
6	3	5.5	20
7	3	6	22

Table-2: Data from patients with no chronic disease and no known coronary artery disease

no	gender	age	Daily routine	Recurring complaints	Marital status	Time between two stress test(months)	Family history of coronary artery disease
1	male	57	sporty	Left shoulder pain	married	40	yes
2	male	55	sporty	Chest pain	married	42	yes
3	female	52	sedentary	syncope	married	39	no
4	male	53	sedentary	Chest pain	single	41	yes
5	male	57	sporty	Left shoulder pain	single	40	yes
6	female	50	sporty	syncope	married	40	no
7	female	49	sporty	ECG changes		41	no
8	female	53	sedentary	syncope	married	39	yes
9	male	49	sedentary	Chest pain	single	38	no
10	male	50	sedentary	Chest pain	single	38	no
11	female	51	sedentary	Left shoulder pain, syncope	married	40	yes
12	male	51	sporty	Chest pain	married	41	yes
13	male	57	sedentary	Chest pain	married	40	yes
14	female	55	sporty	ECG changes	married	40	no
15	female	56	sporty	syncope	married	39	no
16	male	57	sporty	Chest pain	married	39	no
17	male	57	sporty	Chest pain	single	41	yes
18	male	49	sedentary	ECG changes	married	42	yes
19	female	51	sedentary	syncope	married	42	no
20	male	52	sporty	Left shoulder pain	married	40	yes
21	male	55	sporty	Chest pain	married	41	no
22	male	57	sedentary	Chest pain	single	41	no
23	female	49	sedentary	ECG changes, syncope	married	40	no
24	female	52	sporty	syncope	married	39	yes
25	female	53	sporty	Chest pain, syncope	single	39	yes
26	male	55	sporty	Chest pain	single	38	no
27	male	57	sporty	Chest pain	married	38	yes

Table-3: Changes in maximal oxygen consumption, heart rate index, ejection fraction, and body mass index values in patients diagnosed with post-Covid-19 syndrome.

	before Covid-19 infection	post Covid-19 infection	p
Maximal oxygen consumption (kg/ml/min)	43 (28-44)	37 (26-38)	0,0005
heart rate index	2,5 (2,4-2,6)	2,4 (2,3-2,6)	0,0005
Ejection fraction	57 (55-59)	56 (55-59)	0,459
Body mass index	22,9 (19,7-24,9)	23,2 (19,6-24,8)	0,684

Statistics

Continuous variables that were not normally distributed are expressed as medians (minimum and maximum). Categorical variables are expressed as case numbers and percentages. The Wilcoxon test was used to compare continuous variables before and after COVID-19 infection. A p-value of <0.05 was considered statistically significant.

Results

11 (40.7%) of the cases were female. The median age of the patients was 53 (49-57) years. VO2max and HRI values calculated before COVID-19 infection in our patients with PCS were higher than those calculated later. VO2max value in the same patient group, respectively, before and after COVID infection, calculated as 43 (28-44) and 37 (26-38) (p:0.0005). The HRI value is, respectively; calculated as 2.5 (2.4-2.6) and 2.4 (2.3-2.6) (p:0.0005). A significant decrease was observed in VO2max and HRI values in patients with COVID-19 infection and whose complaints persisted at the end of the acute phase. According to our findings, the aerobic capacity was reduced in our PCS patients. The findings are summarized in Table 3.

Discussion

COVID-19 coronavirus disease causes a severe acute respiratory disease called SARS-Cov-2. This disease is difficult to control. In 10-20% of patients who experience the acute symptomatic phase, the effects of the disease may continue after 12 weeks. Available evidence regarding PCS is increasing day by day (14). PCR was negative in all 27 patients included in our study after acute infection between June and August 2021. The coronavirus responsible for SARS-Cov-2 infection causes acute respiratory infection and atypical pneumonia, which can potentially develop into a serious illness. In the infection that emerged in Wuhan city on December 31, 2019, and spread all over the world, clinical findings after COVID treatment lasted longer than 1 month in 10-20% of patients (15). In PCS; headache, confusion, inability to perform daily physical tasks, stress, depression and insomnia. Additionally, as in our patients, fatigue and pain may be prominent throughout the body. Although some medications have been tried, these long-standing complaints have not disappeared (14). Anamneses such as decreased exercise capacity and shortness of breath revealed the need to test patients for CAD.

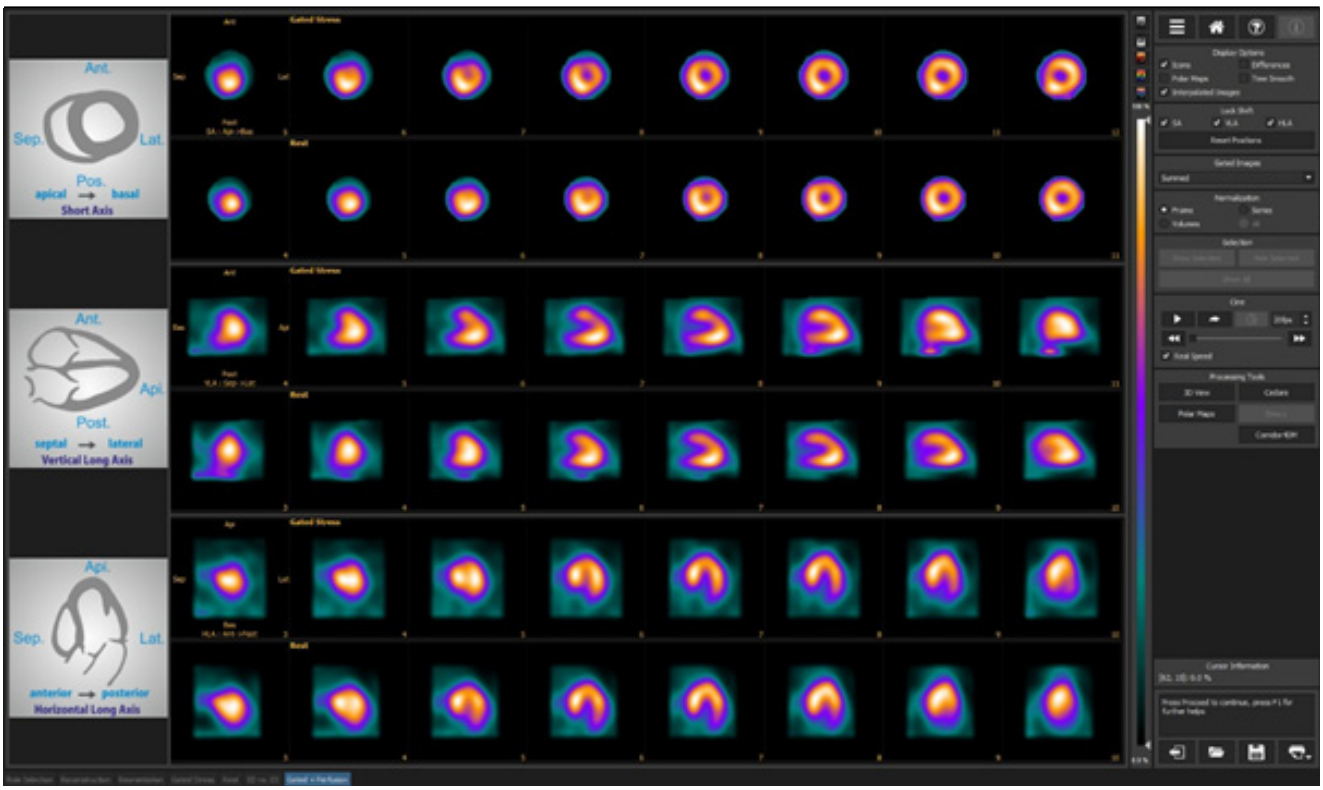


Figure 1: *Sections of left ventricular walls in myocardial perfusion scintigraphy.*

Therefore our patients were referred to the Nuclear Medicine clinic for MPS imaging. Imaging areas in nuclear cardiology include assessments of myocardial perfusion and global ventricular function. Exercise stress is preferred in patients who can exercise adequately. One of the most critical aspects of MPS examination is the ability to visualize myocardial perfusion under maximum stress. In patients with CAD, a homogeneous distribution of resting myocardial blood flow can be observed, up to a degree of coronary artery stenosis of up to 90% (16). Therefore, performing the stress test with optimum quality is crucial for visualizing myocardial ischemia (2). In our nuclear medicine clinic, our patients were subjected to a stress test by an experienced team. During exercise testing, the heart rate and contractility increase to meet the increased peripheral oxygen demand. The maximum physiological oxygen limit that the muscles in the body can reach is 15-17 ml/100 ml. This is also called aerobic capacity and is expressed as VO2max. With gradually increasing exercise, the VO2max curve reaches a plateau toward the end of exercise (3). All patients reached 100% of their maximum heart rate (HRmax), calculated according to the 220-age formula. ECG monitoring was performed during the test. VO2max, or maximum oxygen consumption, refers to the use of oxygen that reaches a certain maximum level as the workload or active muscle mass involved in exercise increases. The unit of VO2max is ml/kg/min. The metabolic equivalent (MET) value was obtained by dividing VO2max by 3.5. VO2max was calculated based on the time (T) to reach the maximum heart rate according to the Bruce protocol (Table 1). These calculation methods are reliable (3). In our study, VO2max was obtained using the calculation method. The same calculation method was used in both the compared studies. No significant difference was found between measurement studies performed using analyzers and indirect calculation methods. The calculation method using formulas is preferred because it is easier to implement, practical, and has low cost. All of our patients reached 100% of the maximum heart rate calculated according to the 220-age formula by exercising at an adequate level between 8 and 10 METs, with the speed and incline increasing every 3 min according to blood pressure. Treadmill testing was terminated because of burnout. It is very important to be able to adequately stress the patient in MPS imaging. The pharmacological stress method is used in patients who cannot reach 85% of the maximum heart rate or cannot reach a sufficient METS value (17). VO2max; It is the highest amount of oxygen that an individual can use during an exercise that involves large muscle groups and increases in intensity. After a certain point, oxygen use remains the same even though the workload increases. It is the amount of oxygen that the body can use in 1 min during exercise at maximum intensity. The amount of oxygen that the muscle can take from the blood and use depends on the blood coming to it and the oxygen content of the blood. VO2max is determined by the maximum amount of oxygen reaching the tissue. The higher the running speed, the higher the oxygen consumption. According to the results of our study, the prominent complaint of fatigue in our PCS patients was evaluated as compatible with the decrease in aerobic capacity. HR and breathing accelerate. VO2max is determined by expressing the amount of O2 expended per minute in volume (L) or by measuring the amount of oxygen taken in 1 min per kilogram of body weight in milliliters. Normally, the VO2max value in women is slightly lower than that in men. There were similar results in our study. Although VO2max values were within normal limits in our study, there was a significant difference between the two studies. The higher the VO2max value, the higher the aerobic capacity. VO2max is a feature that improves with training. Sedentary living during the pandemic may have decreased aerobic capacity. Our patients those who lead sedentary lives. Patients above 7 METS are generally asymptomatic in their daily activities. To exclude coronary artery disease in our patients, it is important to be able to evaluate heart wall perfusion, EDV, ESV, and EF by performing MPS imaging in our patients who underwent the Bruce protocol (3). There were no findings consistent with CAD in our patients' MPS results and ECG follow-ups. Tc-99m-MIBI is a radiopharmaceutical used for intravenous stress and rest imaging in MPS. Iterative reconstruction methods were used. Thus, attenuation, scattering, and blurriness were corrected. Stress testing is used in many clinics to evaluate cardiovascular risk (18). Exercise capacity is a proven prognostic marker of cardiovascular events and mortality (19). There is a linear relationship between oxygen consumption and HR (20). Body morphology is important for maximum performance (21). Unlike fat mass, increasing muscle mass increases performance (22). There was no significant difference between the two studies in terms of the body mass index (BMI) of our patients. VO2max is the maximum amount of oxygen that the body can use per kilogram in liters/minute against increasing workload. A linear relationship exists between workload and oxygen consumption. As exercise intensity increases, oxygen consumption also increases after reaching a plateau and being unable to consume more oxygen, and this point is VO2max. VO2max measurements are also used to determine aerobic capacity and fitness in athletes. Calculating VO2max with the formula. Laboratory tests require expensive teams and equipment (23). METS can be

calculated using HRI. VO2max can be obtained by multiplying METS by 3.5 (13). None of our patients were hospitalized during or after the acute infection. 200 different symptoms have been described in PCS (3). COVID-19 can have many clinical findings due to multiple organ involvement. Meta-analysis studies have shown the long-term effects of COVID-19 infection (24-25). Shortness of breath, smell and taste disorders, fatigue, neuropsychological symptoms, headache, memory loss, slow thinking, anxiety, depression, and sleep disturbance are the most common symptoms. Musculoskeletal complaints are also common. Few studies prospectively evaluate the long-term effects of COVID-19 infection (26-27). 80% of patients have more than one There are symptoms (25). Fatigue, myalgia, sleep disorder, and memory impairment are more common (3,28). These findings were also observed in our patients. The factor that most reduces the quality of life of people with PCS is fatigue. According to the results of our study, this may be due to a decrease in the aerobic capacity. This fatigue also has a neurocognitive aspect (3,28). Patients say that this limits their normal work activities. There are multiple mechanisms underlying PCS. Because of diseases accompanied by genetic factors, COVID-19 may increase existing lesions in target organs or acute COVID-19 organ failure may occur. There may be changes in the immune response to viruses or viral mechanisms (29). Cytokine storm, i.e., innate pathological and exaggerated immune response, causes a serious clinical picture. Persistent autoantibodies may have formed in self-limiting forms. Thromboembolic complications occur because of alterations in the function of the vascular endothelium (30). The continuation of endothelial inflammatory mechanisms may cause chronic symptoms. Our patients were diagnosed with PCS after long clinical evaluations. The duration of the acute phase is important for defining PCS. However, although the existing psychological and other changes are due to COVID-19, atypical findings in patients may prevent the diagnosis of PCS by thinking that it is another disease or bacterial infection. COVID-19 symptoms such as fatigue, headache, myalgia, and chills can be stimulated after mRNA-based vaccines. Patients usually improve over time. Some may get worse. There is no specific treatment for PCS. Acute phase treatment and prevention are performed. Montelukast, naltrexone, hyperbaric oxygen, and supervised exercise were administered. There is no current evidence regarding the role of a nutritional approach or physical exercise in relieving symptoms. Physical exercise can reduce not only acute symptoms but also long-term symptoms. It aims to alleviate symptoms, provide hope, and provide faster recovery (14).

Conclusion

Data on the cardiac effects of COVID-19 infection are very limited. CAD, existing or probably present before infection in patients, is confusing to determine the cause of cardiac effects. It is meaningful to evaluate the prolonged effects of COVID-19 in patient groups that were evaluated for cardiac aspects before infection. PCS complaints are accompanied by a decrease in the aerobic capacity. Identifying the cause of symptoms will enable us to develop new prevention and treatment methods. VO2max and HRI values can be used in patient follow-up in PCS. Prospective studies are required in this regard.

Abbreviations

PCS: post-COVID-19 syndrome

VO2max: oxygen consumption at maximum workload

HR: Heart rate

HRI: Heart rate index

MPS: myocardial perfusion scintigraphy

BP: Bruce Protocol

EDV: end-diastolic volume

ESV: end-systolic volume

EF: ejection fraction

CAD: coronary artery disease

BMI: body mass index

MET: metabolic equivalent

Ethics Approval And Consent To Participate

Our retrospective study was approved by Gaziosmanpaşa Training and Research Hospital Ethics Committee with 72 numbers on 08.06.2022.

Human And Animal Rights

No animals were used for studies that are the basis of this research. All human procedures followed were in accordance with the guidelines of the Helsinki Declaration of 1975.

Consent For Publication

Informed consent was obtained from all participants of this study.

Availability Of Data And Materials

Not applicable.

Funding

None.

Conflict Of Interest

The authors declare no conflicts of interest, financial or otherwise.

Acknowledgements

Declared none.

References

1. Ducharme J, Gibson A, McKenna Z, et al. Does heart rate response confirm the attainment of maximal oxygen uptake in adults 45 years and older? European Journal of Applied Physiology. 2021;121(2):445-52. DOI: 10.1007/s00421-020-04522-2
2. Canbaz Tosun F, Ozdemir S, Sen F, et al. Myocardial Perfusion SPECT Procedure Guideline. Nuclear Medicine Seminars 2020;6:90-134. DOI:10.4274/nts.galenos.2020.0010
3. Davis HE, Assaf GS, McCorkell L, et al. Characterizing long COVID in an international cohort: 7 months of symptoms and their impact. EClinicalMedicine. 2021 Aug;38:101019. DOI: 10.1016/j.eclinm.2021.101019
4. COVID-19 rapid guideline: managing the long-term effects of COVID-19. London: National Institute for Health and Care Excellence (NICE); 2020 Dec 18. PMID: 33555768. *https://www.ncbi.nlm.nih.gov/books/n/nicecollect/*
5. O'Mahoney LL, Routen A, Gillies C, et al. The prevalence and long-term health effects of Long Covid among hospitalised and non-hospitalised populations: A systematic review and meta-analysis. EClinicalMedicine. 2022 Dec 1;55:101762. DOI: 10.1016/j.eclinm.2022.101762.
6. Fox SE, Lameira FS, Rinker EB, et al. Cardiac Endotheliitis and Multisystem Inflammatory Syndrome After COVID-19. Ann Intern Med 2020; 15;173(12):1025-1027. DOI: 10.7326/L20-0882.
7. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet 2020; 395:507-513. DOI: 10.1016/S0140-6736(20)30211-7
8. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020; 395:1054-1062. DOI: 10.1016/S0140-6736(20)30566-3
9. Sala S, Peretto G, Gramegna M, et al. Acute myocarditis presenting as a reverse Tako-Tsubo syndrome in a patient with SARS-CoV-2 respiratory infection. Eur Heart J 2020; 41:1861-1862. DOI: 10.1093/eurheartj/ehaa286
10. Caforio ALP, Baritussio A, Basso C, et al. Clinically Suspected and Biopsy-Proven Myocarditis Temporally Associated with SARS-CoV-2 Infection. Annu Rev Med 2022; 73:149-166. DOI: 10.1146/annurev-med-042220-023859
11. Talar K, Hernández-Belmonte A, Vetrovsky T, et al. Benefits of Resistance Training in Early and Late Stages of Frailty and Sarcopenia: A Systematic Review and Meta-Analysis of Randomized Controlled Studies. J. Clin. Med. 2021,10(8);1630. DOI: 10.3390/jcm10081630
12. Tilkemeier PL, Bourque J, Doukky R, et al. ASNC imaging guidelines for nuclear cardiology procedures: Standardized reporting of nuclear cardiology procedures. J Nucl Cardiol 2017;24:2064-2128. DOI: 10.1007/s12350-017-1057-y
13. Wicks JR, Oldridge NB, Nielsen LK, Vickers CE. HR index--a simple method for the prediction of oxygen uptake. Medicine and science in sports and exercise. 2011;43(10):2005-12. DOI: 10.1249/MSS.0b013e318217276e
14. Jimeno-Almazán A, Pallarés JG, Buendía-Romero Á, et al. Post-COVID-19 Syndrome and the Potential Benefits of Exercise. Int J Environ Res Public Health. 2021 May 17;18(10):5329. DOI: 10.3390/ijerph18105329
15. Ruegsegger GN, Booth FW. Health Benefits of Exercise. Cold Spring Harb Perspect Med. 2018 Jul 2;8(7):a029694. DOI: 10.1101/cshperspect.a029694
16. Seitun S, De Lorenzi C, Cademartiri F, et al. CT Myocardial Perfusion Imaging: A New Frontier in Cardiac Imaging. Biomed Res Int. 2018 Oct 14;2018:7295460. DOI: 10.1155/2018/7295460.
17. Henzlova MJ, Duvall WL, Einstein AJ, et al. ASNC imaging guidelines for SPECT nuclear cardiology procedures: Stress, protocols, and tracers. J Nucl Cardiol 2016;23:606-639. DOI: 10.1007/s12350-015-0387-x.
18. Harb SC, Wang TKM, Cremer PC, et al. Associations between cardiorespiratory fitness, sex and long term mortality amongst adults undergoing exercise treadmill testing. International Journal of Cardiology 342 (2021); 103-107. DOI: 10.1016/j.ijcard.2021.07.063
19. Harb SC, Marwick TH. Prognostic value of stress imaging after revascularization: a systematic review of stress echocardiography and stress nuclear imaging. Am Heart J. 2014 Jan;167(1):77-85. DOI: 10.1016/j.ahj.2013.07.035
20. Mandsager K, Harb S, Cremer P, et al. Association of Cardiorespiratory Fitness With Long-term Mortality Among Adults Undergoing Exercise Treadmill Testing. JAMA Netw Open. 2018 Oct 5;1(6):e183605. DOI: 10.1001/jamanetworkopen.2018.3605
21. Bjelica D, Gardasevic J, Vasiljevic I. Morphological Characteristics and Body Composition of Football Players FC Sutjeska and FC Mladost in Montenegro (March 11, 2018). *http://dx.doi.org/10.2139/ssrn.3138134*
22. Gardasevic J, Bjelica D. Body Composition Differences between Football Players of the Three Top Football Clubs. International Journal of Morphology. 2020;38(1), 153-158. DOI: 10.4067/S0717-95022020000100153
23. Colosio AL, Lievens M, Pogliaghi S, Bourgois JG, Boone J. Heart rate-index estimates aerobic metabolism in professional soccer players. Journal of science and medicine in sport. 2020;23(12):1208-14. DOI: 10.1016/j.jsams.2020.04.015
24. Fazackerley LA, Fell JW, Kitic CM. The effect of an ultra-endurance running race on heart rate variability. European journal of applied physiology. 2019;119(9):2001-2009. DOI: 10.1007/s00421-019-04187-6
25. Lopez-Leon S, Wegman-Ostrosky T, Perelman C, et al. More than 50 Long-term effects of COVID-19: a systematic review and meta-analysis. medRxiv [Preprint]. 2021 Jan 30:2021.01.27.21250617. Update in: Sci Rep. 2021 Aug 9;11(1):16144. DOI: 10.1101/2021.01.27.21250617
26. Hoshijima H, Mihara T, Seki H, et al. Incidence of long-term post-acute sequelae of SARS-CoV-2 infection related to pain and other symptoms: A systematic review and meta-analysis. PLoS One. 2023 Nov 29;18(11):e0250909. DOI: 10.1371/journal.pone.0250909
27. Garrigues, E.; Janvier, P.; Kherabi, Y.; Le Bot, A.; Hamon, A.; Gouze, H.; Doucet, L.; Berkani, S.; Oliosi, E.; Mallart, E.; et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. J. Infect. 2020, 81, e4–e6. DOI: 10.1016/j.jinf.2020.08.029
28. Sykes DL, Holdsworth L, Jawad N, et al. Post-COVID-19 Symptom Burden: What is Long-COVID and How Should We Manage It? Lung 2021,199(2);113–119. DOI: 10.1007/s00408-021-00423-z
29. Chopra V, Flanders SA, O'Malley M, et al. Sixty-Day Outcomes Among Patients Hospitalized With COVID-19. Ann Intern Med. 2021 Apr;174(4):576-578. DOI: 10.7326/M20-5661
30. Sokolowska M, Lukasik ZM, Agache I, et al. Immunology of COVID-19: Mechanisms, clinical outcome, diagnostics, and perspectives—A report of the European Academy of Allergy and Clinical Immunology (EAACI). Allergy 2020,75(10); 2445–2476. DOI: 10.1111/all.14462

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/ 10.31067/acusaglik.1348303

Elevated Depression, Anxiety and Hopelessness Among Pregnant Individuals with Ovarian Cyst

Mine DAĞGEZ[1], Cem YENER[2]

[1]Tekirdağ City Hospital, Department of Obstetrics and Gynecology, Division of Gynecologic Oncology, Tekirdag, Turkiye

[2]Bağcılar Research and Educational Hospital, Department of Obstetrics and Gynecology, Division of Perinatology, Istanbul, Turkiye

Mine DAĞGEZ
0000-0001-5266-9652

Cem YENER
0000-0002-3976-4492

Correspondence: Dr. Mine Daggez
Tekirdağ City Hospital, Department of Obstetrics and Gynecology, Division of Gynecologic Oncology, Tekirdag, Turkiye
Phone: +90 533 483 82 37
E-mail: minedaggez@gmail.com

Received: 22.08.2023
Accepted: 05.02.2024

ABSTRACT

Purpose: Anxiety and depression in pregnancy commonly presents between 10 and 25% of pregnant individuals. Increased symptoms of depression and anxiety are coupled with elevated risk of preterm birth, postpartum depression, and behavioral difficulties in children. Detection of ovarian cyst is a potential stressor factor for pregnant individuals. Our objective was to investigate the levels of anxiety, depression and hopelessness in pregnant individuals with ovarian cyst.

Methods: In this comparative and descriptive study, a total of 184 pregnant women were divided into 2 groups. Group 1 encompasses pregnant women with ovarian cyst (n=86), and Group 2 includes healthy pregnant women as control (n=88). Data were collected using Demographic Questionnaire, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Beck Hopelessness Scale (BHS) and Pregnancy Related Anxiety Questionnaire-Revised 2 (PRAQ-R2).

Results: We found substantially elevated BDI, BAI, BHS AND PRAQ-R2 scores in Group 1 according to Group 2 [(15.16±12.6, 6.45±5.6), (16.44±14.5, 7.61±5.2), (9.44±8.3, 4.10±5.2), (30.99±9.66, 27.2±4.90), respectively] ($p<0.05$). However, there wasn't significant difference between groups in demographic characteristics ($p>0.05$).

Conclusion: Anxiety, depression and hopelessness are observed more among pregnant women with ovarian cyst. Nevertheless, approximately 70 percent of all ovarian cysts spontaneously resolve during pregnancy and more than 90 percent of them are benign. Hence, the patient should be informed appropriately by obstetricians before referring them to tertiary centers, and this approach may mitigate their anxiety, depression and hopelessness.

Keywords: Anxiety disorders; depression; ovarian cysts; pregnancy outcome

ÖZET

Amaç: Gebelikte anksiyete ve depresyon genellikle gebe bireylerin %10 ila 25'inde görülür. Artan depresyon ve anksiyete semptomları, gebelerde erken doğum, doğum sonrası depresyon ve çocuklarda davranışsal bozukluklar riskinin artmasıyla birleşir. Yumurtalık kistinin saptanması gebe bireyler için potansiyel bir stres faktörüdür. Amacımız over kisti olan gebelerde anksiyete, depresyon ve umutsuzluk düzeylerini araştırmaktı.

Yöntemler: Bu karşılaştırmalı ve tanımlayıcı çalışmada toplam 184 gebe 2 gruba ayrıldı. Grup 1'de over kisti olan gebeler (n=86), Grup 2'de kontrol (n=88) olarak sağlıklı gebeler yer almaktadır. Veriler, Demografik Anket, Beck Depresyon Envanteri (BDÖ), Beck Anksiyete Envanteri (BAÖ), Beck Umutsuzluk Ölçeği (BHS) ve Gebelikle İlgili Anksiyete Anketi-Gözden Geçirilmiş 2 (PRAQ-R2) kullanılarak toplanmıştır.

Bulgular: Grup 1'de BDÖ, BAÖ, BHS VE PRAQ-R2 puanlarını Grup 2'ye göre [(15,16±12,6, 6,45±5,6), (16,44±14,5, 7,61±5,2), (9,44±8,3, 4,10±5,2) oldukça yüksek bulduk, (sırasıyla 30,99±9,66, 27,2±4,90)] ($p<0.05$). Ancak gruplar arasında demografik özellikler açısından anlamlı fark yoktu ($p>0.05$).

Sonuç: Yumurtalık kisti olan gebelerde kaygı, depresyon ve umutsuzluk daha fazla gözlendi. Bununla birlikte, tüm yumurtalık kistlerinin yaklaşık yüzde 70'i hamilelik sırasında kendiliğinden düzelir ve yüzde 90'dan fazlası iyi huyludur. Hastalar üçüncü basamak merkezlere sevk edilmeden önce kadın doğum uzmanları tarafından uygun şekilde bilgilendirilmelidir. Bu yaklaşım hastaların anksiyete, depresyon ve umutsuzluk düzeylerini azaltabilir.

Anahtar Kelimeler: Anksiyete bozuklukları, depresyon, yumurtalık kistleri, gebelik sonuçları

The incidence of adnexal masses in pregnancy ranges from 0.05% to 2.4%, and approximately 1% to 6% of these masses are malignant (1). Before the widespread use of ultrasound, most ovarian cysts in pregnant women could be detected during cesarean delivery or when they gave symptoms in the postpartum period. Today, many asymptomatic ovarian cysts can be detected incidentally on antenatal ultrasound performed in the first trimester (2). Most of the ovarian cysts noticed in pregnancy are benign simple cysts smaller than 5 cm (3). Approximately 70% of adnexal masses encountered in the first trimester disappear spontaneously in the early second trimester (4).

Anxiety and depression in pregnancy may lead to preterm labor and also have negative implications for fetal neurodevelopment (5). In addition, mental problems during pregnancy might be associated with pregnancy complications such as abortus imminens (6).

Herein, we endeavored to elucidate whether ovarian cysts in pregnant individuals could bring about negative psychological reactions. Hence, we performed questionnaires and aimed to investigate the levels of anxiety, depression and hopelessness in pregnant individuals with ovarian cyst.

Material and Methods

This prospective descriptive-comparative research was conducted with a total of 184 pregnant women between April and July, 2023. Group 1 consists of pregnant individuals with ovarian cyst (n=86) who were referred to the Gynecologic Oncology outpatient Clinic in a tertiary medical center and Group 2 includes healthy ones as controls (n=88) who were followed-up routinely at this reference center in the Thrace Region of Turkey. A random sampling method was implemented to elect the control participants. All of the participants accomplished a consent form which apparently defines the purpose of the present study. The power analysis was performed at a 95% confidence interval. While the power of the study was ascertained as 0.96, its effect size was moderate (0.5) and it was deduced that the sample size was a good representative of the population. Half of both groups were composed of nulliparous pregnancies. [Group 1 (n=43), Group 2 (n=44)]. The study was approved by the local institutional ethics committee (protocol number: 2023/039). All participants were older than 18 years old, under 16th weeks of gestation and without past history of any chronic medical diseases or mental issues. We excluded patients with increased tumor markers, ovarian cyst bigger than 10 cm, cysts containing solid components with septum and papillary projections (n=1). Besides, patients who were illiterate, non-Turkish citizens and also who did not opt to attend were excluded.

The study data were obtained applying the Personal Information Form, Beck Depression Inventory (BDI) (7), Beck Anxiety Inventory (BAI) (8), Beck Hopelessness Scale (BHS) (9) and Pregnancy Related Anxiety Questionnaire-Revised 2 (PRAQ-R2) (10) by utilizing face to face interview technique.

Turkish version of the BDI which encompasses 21-item scale was performed (11). The minimum and maximum attainable scores to be acquired from the total scale are 0 and 63, respectively. According to the scores acquired from the BDI in the validity and reliability study, depression levels are defined as follows: 0 to 9 = minimal depression, 10 to 18 = mild depression, 19 to 29 = moderate depression, and 30 to 63 = severe depression. Turkish version of the BAI which consists of 21-item scale was applied (12). Anxiety levels are classified as minimal-low (0-15 points), moderate (16-25 points), and high (26 points and more) in respect to the scores. Turkish version of the 20-item BHS scale was performed (13). The BHS contains 20 dichotomous "true/false" items that objected to evaluate three major aspects of hopelessness: feelings about the future, loss of motivation, and expectations. Total scores were calculated by first reverse-coding nine items (items 1, 3, 5, 6, 8, 10, 13, 15, 19) and then summing the item scores. Higher total scores display greater hopelessness (range 0–20). Turkish version of the PRAQ-R2 scale which consists of 11 items for nulliparous women and 10 items for primaparous/multiparous women was employed (14). The scale has three subscales, including "fear of giving birth (items 1, 2, 6 and 8)", "worries of bearing a physically or mentally handicapped child (items 4, 9, 10 and 11)" and "concerns about own appearance (items 3, 5 and 7)". The 8th item in the scale (I fear giving birth, because I have never experienced this before) is employed to solely nulliparous women. The scale items are scored between 1 and 5 (1-Absolutely not relevant and 5-Very relevant). The lowest and highest scores are 11 and 55 for nulliparous women, and 10 and 50 for primaparous/multiparous women, respectively. A higher scale score shows a higher level of anxiety in pregnancy. For each scale the Cronbach's alpha internal consistency value was calculated.

SPSS 25 (Statistical Package for Social Science, Chicago, Il, USA) Windows package program was applied for statistical analysis. Descriptive statistical methods (mean, standard deviation) were used when evaluating study data. Fisher's exact test, t-test, χ2 test, Kruskal-Wallis test, Mann-Whitney U test, and stepwise regression analysis were applied in the comparison of the distribution of the data acquired from the groups. To evaluate the mean scale scores and intergroup differences, one-way ANOVA was performed. Differences were defined as significant when p<0.05.

Results

The mean age of Group 1 and Group 2 was 26.70 ±4.72 and 27.08±4.10, respectively. The mean gestational age was 11.4±3.12 for Group 1 and 11.1±2.68 for Group 2. Half of both groups were composed of nulliparous pregnancies. [Group 1 (n=43), Group 2 (n=44)]. Gravida was found to be 2.1±1.1 and 2.3±0.4 in Group 1and Group 2, respectively. There was no significant difference in terms of age, spouse's age, education level, working status, economic situation and partner relationship/support (p>0.05) (Table 1).

Table 1. Comparison of the descriptive characteristics of the groups.

	Group 1 (n=86) Mean ± SD or n (%)	Group 2 (n=88)	t-test and p value
Age (years)	26.70 ±4.72	27.08±4.10	t=0.783 p=0.562
Spouse's age (years)	34.70±5.30	33.91±5.38	t=1.224 p=0.286
Education			X^2 =3.459 p=0.294
Primary school	12 (13.9)	10 (11.3)	
High school	73 (84.8)	76 (86.3)	
University	1 (1.4)	2 (2.4)	
Job			X^2=0.186 p=0.669
Working	2 (2.8)	4 (4.8)	
House-wife	84 (97.2)	84 (95.2)	
Economic situation			X^2 =4.121 p=0.122
Income more than expenses	20 (23.2)	19(21.5)	
Income equivalent or less than expenses	66 (76.8)	69 (78.5)	
Partner relationship and support			X^2 =3.446 p=0.082
Positive	80 (91.6)	77 (86.8)	
Negative	1 (1.4)	1 (1.2)	
Neutral	5 (7)	10 (12)	

t: Indepent samples t- tests X^2=Pearson's Chi-Squared Test.

Cronbach's alpha coefficients were found as 0.93, 0.94, 0.91 and 0.87 for BDI, BAI, BHS and PRAQ-R2, respectively.

The mean BDI, BAI and BHS score of Grup1 and Group 2: [(15.16±12.6, 6.45±5.6), (16.44±14.5, 7.61±5.2), (9.44±8.3, 4.10±5.2), respectively. Group 1 scores were significantly found to be higher than Group 2 (p<0.05) (Table 2).

Table 2. Comparison of the scores between groups.

	Mean ± SD	t-test and p value
Beck Depression Inventory		t=3.56 p= .000*
Group 1	15.16±12.6	
Group 2	6.45±5.6	
Beck Anxiety Inventory		t=3.67 p= .000*
Group 1	16.44±14.5	
Group 2	7.61±5.2	
Beck Hopelessness Scale		t=3.59 p= .000*
Group 1	9.44±8.3	
Group 2	4.10±5.2	

*t: Indepent samples t- tests *p<0.05*

The mean PRAQ-R2 scores of Group 1 and Group 2 were 30.99±9.66, 27.2±4.90, respectively. (p<0.05). According to subscales of PRAQ-R2 test, ''worries about bearing a handicapped child'' and ''concern about one's own appearance'' scores were observed higher in Group 1 (10.4±3.09 and 7.54±2.80, respectively) than Group 2 (10.2±2.60 and 7.02±2.90, respectively), yet not statistically substantial (p>0.05) (Table 3).

Table 3. Total and subscales PRAQ-R2 scores of the groups

	Group 1 (n=86)	Group 2 (n=88)	t-test and p value
Total score	30.99±9.66	27.2±4.90	t=4.085 p=*.01
PRAQ-R2 Subscales			
Fear of giving birth	11.82±3.89	7.44±2.43	t=4.620 p=*.001
Worries about bearing a handicapped child	10.4±3.09	10.2±2.60	t=0.447 p=0.657
Concern about one's own appearance	7.54±2.80	7.02±2.90	t=-1.146 p=0.254

*t: Indepent samples t- tests *p<0.05*

Discussion

In this study, we observed higher levels of anxiety, depression and hopelessness in pregnant individuals with ovarian cyst. Prevalence of depression during pregnancy differs depending on the criteria used, albeit may be as high as 16% or more women symptomatic and 5% with major depression (15). Some of the stressors that generally influence women in pregnancy are low income, adverse working conditions, heavy family and household responsibilities, strain in intimate relationships, and pregnancy complications such as threatened abortus. Zhu et al. (16) in their study found out significantly higher levels of major depression and anxiety among women facing threatened miscarriage compared to those with uneventful pregnancies.

Anxiety in pregnancy is connected with preterm delivery and has adverse implications for fetal neurodevelopment. It may provoke child impaired cognitive development and behavioral problems such as: autism and schizophrenia (5,17). Several studies showed that premature delivery and low-birth weight babies are seen more in pregnancies with anxiety and depression (18-20). Goedhart et al. (21) in their multiethnic cohort study consisted of 8,052 women showed that maternal depressive symptoms during pregnancy are associated with preterm delivery, small for gestational age and low Apgar score.

The prevalence of ovarian cysts in pregnant individuals is 0.05-3.2% of live births (1, 22-23). Most ovarian cysts in pregnancy seem to have a low risk of malignancy and consequently they may be managed expectantly for the reason that most of them resolve during pregnancy. Bernard et al. (24) in their study with 422 patients with ovarian cyst 320 (76%) of them were simple cyst and also 70 of 102 large or complex cyst resolved (24). In another observational study with 803 women, the cysts resolved in 707 (88.1%) and it was deduced that ovarian masses detected during pregnancy can be serially monitored without intervention (25).

Prenatal education is carried out in many countries, yet it differs in content, quality and format (26). Prenatal education may have a paramount role in ameliorating perinatal psychological disorders (27). Although, Cochrane qualitative review exhibited that prenatal care information is inadequate to fulfill women's information request (28). In our research, we noticed higher levels of anxiety among pregnant women with ovarian cyst. We deemed that these women weren't informed precisely about ovarian cysts by obstetricians due to the excess number of patients, lack of examination time and also the shortage of medical staff.

A major strength of the present study is that: to our knowledge it is the novel study which evaluates psychological reactions of pregnant individuals with ovarian cyst. The limitations of our study are that it was a single-center study and the study population was small. In addition, we don't have maternal-fetal outcomes of the study population.

Conclusion

We showed that pregnant individuals with ovarian cysts have higher levels of anxiety, depression and hopelessness. Nevertheless, ovarian cyst during pregnancy mostly benign and they disappear spontaneously. Hence, obstetricians should give comprehensive information before referring patients to the tertiary centers. Contemplating national health programs to ease the burden of the staffing shortages and providing more time for patient's counsel can be helpful. These approaches may hinder their needless anxiety and hopelessness and adverse maternal-fetal outcomes might be diminished subsequently.

Declarations

Funding

Not applicable

Conflicts of interest/ Competing interests

The authors declare no competing interests related to the subject matter or materials discussed in this article.

Ethics approval

The study is approved by Instituional Review Board of Tekirdag City Hospital with approval number 2023/039

Availability of data and material

Data can be shared if requested.

Authors' contributions

Conceived and designed the experiments: CY; Performed the experiments: MD; Analyzed the data: CY; Contributed reagents/ materials/ analysis tools: CY; Wrote the manuscript: CY, MD; Final edit of paper: MD.

References

1. Webb KE, Sakhel K, Chauhan SP, et al. Adnexal mass during pregnancy: a review. *Am J Perinatol*. 2015;32(11):1010-1016. doi:10.1055/s-0035-1549216
2. Palmer J, Vatish M, Tidy J. Epithelial ovarian cancer in pregnancy: a review of the literature. *BJOG*. 2009;116(4):480-491. doi:10.1111/j.1471-0528.2008.02089.x
3. Schmeler KM, Mayo-Smith WW, Peipert JF, et al. Adnexal masses in pregnancy: surgery compared with observation. *Obstet Gynecol*. 2005;105(5 Pt 1):1098-1103. doi:10.1097/01.AOG.0000157465.99639.e5
4. Giuntoli RL 2nd, Vang RS, Bristow RE. Evaluation and management of adnexal masses during pregnancy. *Clin Obstet Gynecol*. 2006;49(3):492-505. doi:10.1097/00003081-200609000-00009
5. Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry*. 2012;25(2):141-148. doi:10.1097/YCO.0b013e3283503680
6. Madhavanprabhakaran GK, D'Souza MS, Nairy KS. Prevalence of pregnancy anxiety and associated factors. Int J Afr Nurs Sci. 2015;3:1-7.
7. Beck AT, Warc CH, Mendelson M,et al. An inventory for measuring depression. Arch Gen Psychiatry. 1961;4:561-571.
8. Beck AT, Epstein N, Brown G, et al. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol. 1988; 56:893-897.
9. Beck AT, Weissman A, Lester D, et al. The measurement of pessi-mism: the hopelessness scale. J Consult Clin Psychol. 1974;42(6):861-865.
10. Huizink AC, Delforterie MJ, Scheinin NM, et al. Adaption of pregnancy anxiety questionnaire-revised for all pregnant women regardless of parity: PRAQ-R2. *Arch Womens Ment Health*. 2016;19(1):125-132. doi:10.1007/s00737-015-0531-2
11. Hisli N. Validity and reliability of Beck Depression Inventory for university students. Psikoloji dergisi. 1989;7(23):3-13.
12. Ulusoy M, Sahin NH, Erkmen H. Turkish version of the Beck Anxiety Inventory: psychometric properties. J Cogn Psychother. 1998;12(2):163-172.
13. Seber G, Dilbaz N, Kaptanoğlu C, et al. Hopelessness scale: validity and reliability. Crisis J. 1993;1(3):139-142.
14. Derya, Y.A, Taşhan, S.T, Duman, M, et al. Turkish adaptation of the pregnancy-related anxiety questionnaire-revised 2: validity and reliability study in multiparous and primiparous pregnancy. Midwifery 62, 61–68, 2018.
15. Leight KL, Fitelson EM, Weston CA, et al. Childbirth and mental disorders. *Int Rev Psychiatry*. 2010;22(5):453-471. doi:10.3109/09540261.2010.514600
16. Zhu CS, Tan TC, Chen HY, et al. Threatened miscarriage and depressive and anxiety symptoms among women and partners in early pregnancy. *J Affect Disord*. 2018;237:1-9. doi:10.1016/j.jad.2018.04.012
17. O'Donnell K, O'Connor TG, Glover V. Prenatal stress and neurodevelopment of the child: focus on the HPA axis and role of the placenta. *Dev Neurosci*. 2009;31(4):285-292. doi:10.1159/000216539
18. Grote NK, Bridge JA, Gavin AR, et al. A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Arch Gen Psychiatry*. 2010;67(10):1012-1024. doi:10.1001/archgenpsychiatry.2010.111
19. Fransson E, Ortenstrand A, Hjelmstedt A. Antenatal depressive symptoms and preterm birth: a prospective study of a Swedish national sample. *Birth*. 2011;38(1):10-16. doi:10.1111/j.1523-536X.2010.00441.x
20. Orr ST, Reiter JP, Blazer DG, et al. Maternal prenatal pregnancy-related anxiety and spontaneous preterm birth in Baltimore, Maryland. *Psychosom Med*. 2007;69(6):566-570. doi:10.1097/PSY.0b013e3180cac25d
21. Goedhart G, Snijders AC, Hesselink AE, et al. Maternal depressive symptoms in relation to perinatal mortality and morbidity: results from a large multiethnic cohort study. *Psychosom Med*. 2010;72(8):769-776. doi:10.1097/PSY.0b013e3181ee4a62
22. Zanetta G, Mariani E, Lissoni A, et al. A prospective study of the role of ultrasound in the management of adnexal masses in pregnancy. *BJOG*. 2003;110(6):578-583.
23. Whitecar MP, Turner S, Higby MK. Adnexal masses in pregnancy: a review of 130 cases undergoing surgical management. *Am J Obstet Gynecol*. 1999;181(1):19-24. doi:10.1016/s0002-9378(99)70429-1
24. Bernhard LM, Klebba PK, Gray DL, et al. Predictors of persistence of adnexal masses in pregnancy. *Obstet Gynecol*. 1999;93(4):585-589. doi:10.1016/s0029-7844(98)00490-6
25. Brady PC, Simpson LL, Lewin SN, et al. Safety of conservative management of ovarian masses during pregnancy. *J Reprod Med*. 2013;58(9-10):377-382.
26. Gagnon AJ, Sandall J. Individual or group antenatal education for childbirth or parenthood, or both. *Cochrane Database Syst Rev*. 2007;2007(3):CD002869. Published 2007 Jul 18. doi:10.1002/14651858.CD002869.pub2
27. Stoll K, Swift EM, Fairbrother N, et al. A systematic review of nonpharmacological prenatal interventions for pregnancy-specific anxiety and fear of childbirth. *Birth*. 2018;45(1):7-18. doi:10.1111/birt.12316
28. Downe S, Finlayson K, Tunçalp Ö, et al. Provision and uptake of routine antenatal services: a qualitative evidence synthesis. *Cochrane Database Syst Rev*. 2019;6(6):CD012392. Published 2019 Jun 12. doi:10.1002/14651858.CD012392.pub2

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/ 10.31067/acusaglik.1287382

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Obstetrics and Gynaecology / Kadın Hastalıkları ve Doğum

Impact of maternal Age on Perinatal Results

Kamuran SUMAN[1], Ebru GÖK[2], Musa BÜYÜK[3], Murat SUMAN[3]

[1]Afyonkarahisar State Hospital,
[2]Erciyes University,
[3]Cay State Hospital

Kamuran SUMAN
0000-0003-1814-7513
Ebru GÖK
0000-0001-7655-2301
Musa BÜYÜK
0000-0003-1397-9273
Murat SUMAN
0000-0002-7078-9970

Correspondence: Kamuran Suman
Phone: +90 532 481 85 43
E-mail: muratsuman@hotmail.com

Received: 25.04.2023
Accepted: 13.11.2023

ABSTRACT

Aim: The principal objective of this study was to evaluate the maternal, fetal, and neonatal outcomes of pregnancies managed by a multidisciplinary team of perinatologists, obstetricians, and pediatricians in three distinct healthcare centers.

Materials and Methods: In order to improve perinatal and neonatal care and minimize maternal and infant mortality, we conducted a study by analyzing electronic records of pregnant women who delivered at our healthcare centers between 2016 and 2021. The study consisted of 403 adolescents aged 15-19, 491 women of advanced age over 40 years, and 200 pregnant women aged 20-39 years. The aim was to identify any patterns or differences in outcomes between the age groups and determine the role of the healthcare team in improving these outcomes.

Results: Our study analyzed the data and found that the frequency of cesarean section was significantly higher in the group of pregnant women with advanced age compared to the other age groups ($p<0.05$). Additionally, the rates of gestational diabetes and pregnancies lasting more than 34 weeks (approximately 8 months) were found to be statistically different in comparison to the other age groups ($p<0.05$). These findings suggest that the age of the mother is a critical factor that influences pregnancy outcomes.

Conclusion: Our study has revealed that pregnancies in adolescent and advanced age groups have resulted in better perinatal and neonatal outcomes. We suggest that improving the conditions for healthcare service delivery and raising awareness among mothers and healthcare workers could contribute to further enhancing perinatal outcomes.

Keywords: Pregnancy in Adolescence, Maternal Age, Infant Health, Perinatal Care, Pregnancy Complications.

ÖZET

Amaç: Bu çalışmada, perinatolog, kadın doğum uzmanı ve pediatrist meslektaşlarımızın çalıştığı üç ayrı merkezde son beş yılda takip edilen gebelerin yaş gruplarına göre maternal, fetal ve neonatal sonuçları değerlendirdik.

Gereç ve Yöntemler: Bu çalışmada, 2016-2021 yılları arasında üç farklı merkezde takip edilen gebelerin farklı yaş gruplarına (15-19 yaş arası adolesanlar, 40 yaş ve üzeri ileri yaş gebeler ve 20-39 yaş arası kontroller) göre maternal, fetal ve neonatal sonuçları değerlendirildi. Bu hastaların kayıtlarından elde edilen veriler analiz edildi.

Bulgular: Analiz sonucunda, ileri yaş olarak tanımlanan kırk yaş ve üstü kadınlarda pariyete, gestasyonel hipertansiyon, sezaryen ve fetal distres sıklığı kontrol grubuyla karşılaştırıldığında anlamlı derecede daha yüksek bulundu ($p <0.05$). Bununla birlikte, adelösan olarak tanımlanan (15-19 yaş aralığındaki) hastalarda pariyete, gestasyonel diyabet, sezaryen ve >34 gebelik haftası doğum sıklığı kontrol grubuyla karşılaştırıldığında anlamlı derecede daha düşük değerler elde edildi ($p <0.05$).

Sonuç: Analiz ettiğimiz verilerden elde ettiğimiz sonuçlara göre, tüm gebelik gruplarındaki perinatal ve neonatal sonuçların önceki dönemlere kıyasla iyileştiği gözlenmiştir. Bu durum, sadece sağlık hizmetlerinin kalitesi ve sunumundaki gelişmelerden kaynaklanmamaktadır. Aynı zamanda, annelerin ve sağlık çalışanlarının gebelik ile ilgili farkındalıklarının artırılması da daha iyi perinatal sonuçların elde edilmesinde önemli bir rol oynamaktadır. Bu nedenle, gebelikle ilgili bilgilendirme ve farkındalık programlarının geliştirilmesi, perinatal sonuçları daha da geliştirmek için önemli bir adım olabilir.

Anahtar Kelimeler: anne yaşı, ergenlik dönemi gebelikleri, gebelik komplikasyonları, yenidoğan sağlığı, perinatal bakım.

In recent times, there has been an increase in gestational age which is attributed to changes in living conditions. A similar trend is observed in adolescent pregnancies. However, when the gestational age is extremely high, there is an increased risk of morbidity and mortality for both the mother and child. Although reducing the number of extreme cases is a logical solution, improving perinatal care and raising awareness among health personnel are also important.[1] According to the World Health Organization, adolescence is defined as ages between 10 and 19. The WHO report indicates that adolescent pregnancy remains a leading cause of high-risk pregnancy, with around 12 million girls aged 15-19 becoming pregnant each year, and at least 777,000 girls under the age of 15 becoming pregnant. [2]While the rate of adolescent pregnancy has decreased in low- and middle-income countries over the past few decades, it still poses a significant risk to maternal and neonatal health. Adolescent pregnancy is still a significant cause of high-risk pregnancy, but its prevalence has been decreasing in low- and middle-income nations for the past few decades. In developed countries, women's career aspirations, financial stability goals, and advancements in assisted reproductive technology are leading to a rise in the average age of first-time mothers, which is now in the late 30s and early 40s.[3] Although most researchers consider advanced maternal age to be 35 years and older, the medical community frequently regards 40 years as the threshold. Over the previous 30 years, the average age of mothers in the United States has risen by 2.6 years, from 21 to 25.[4] The trend of mothers giving birth at older ages has been observed in other Western countries, with studies showing that mothers in Sweden, Switzerland, Denmark, and the United Kingdom are approaching an average age of 30 for their first child. According to the Demographic and Health Survey of Turkey, a significant proportion of women under the age of 18 and over the age of 35 are giving birth to their first child. In the Afyon province of our country, there is a lack of research regarding the pregnancy status of adolescent and elderly women. Therefore, this study aims to examine the maternal, fetal, and neonatal outcomes of pregnancies in adolescent and elderly women at a tertiary reference center in the past decade. The results of this study are expected to serve as a predictive model for maternal and neonatal outcomes in urban areas with similar demographic characteristics.

Materıals and Methods

In this retrospective study, maternal and neonatal data were collected from electronic hospital records(inpatient and outpatients) of 403 adolescent (15-19 years), 491 elderly (over 40 years) women, and 200 pregnant controls. This study was conducted between the years 2016 and 2021 at three distinct medical centers, one of which was a university hospital in central Anatolia. Maternal, fetal, and neonatal outcomes of the monitored pregnant women were assessed according to different age groups. Among these deliveries, pregnancy rates were approximately 3.8% and 3.9% for adolescent and older women, respectively. In the study, the control group was randomly selected from women who had given birth between the ages of 20 and 39. All adolescent and older pregnant women were included in the study, and no exclusion criteria other than maternal age applied to the control group.

Our study collected maternal and neonatal data, including pregnancy characteristics, fetal presentation, and perinatal information, such as Apgar scores and whether it was a multiple pregnancy. The perinatal results of newborns were obtained from pediatricians within the hospital system. The study was conducted in accordance with the principles of the Declaration of Helsinki and approved by the local ethics committee under registration number 2020-05/16.

For statistical analysis, we used the latest version of SPSS. The independent t-test was applied to determine the significance of differences between pairs, while the chi-square test or Fisher's exact test was used to compare categorical variables. The distribution of numerical variables was evaluated using the Kolmogorov-Smirnov test. We used odds ratios and corresponding 95% confidence intervals to determine the relationship between categorical variables with significance set at 5%. We also conducted binary logistic regression analysis to evaluate the effect of variables on the groups. Differences were considered statistically significant at $p < 0.05$.

Results

The study investigated perinatal and neonatal features in 403 adolescents, 491 older women, and 200 control subjects. Table 1 displayed the obstetric characteristics of all the groups, revealing that the advanced aged group had significantly higher rates of one or more deliveries and cesarean deliveries than the other groups. Conversely, the adolescent group had lower rates of births and cesarean sections, which was statistically significant when compared to the control group ($p<0.05$). The higher number of cesarean sections in multiparous women was primarily due to previous cesarean sections, which was observed in 30% of older women, 10% of adolescents, and 27% of the control group. There was no significant difference in the incidence of multiple pregnancies and vertex presentation ($p>0.05$). However, there was no statistically

significant difference observed in the incidence of stillbirths (p>0.05). The study found no association between maternal age and stillbirths.

Table 1: Features of Pregnancies			
	Cont. (n=200)	**Adolescents (n=403)**	**Age >40 (n=491)**
Age (y)	26.8	18.1	41.6
Parity			
0	79 (36%)	356(87.5%)	75 (10.5%)
1 or more	121 (64%)[c]	47 (12.5%)[a]	416 (89.5%)[b]
Mult. pregnancy			
No	191 (96%)	396 (96.9%)	483 (98.1%)
Yes	9 (4%)[a]	7 (3.1%)[a]	8 (1.9%)[a]
Stillbirth (<20 gestational week)			
No	196 (98.6%)	395 (96.8%)	465 (94.7%)
Yes	4 (1.4%)[a]	8 (3.2%)[a]	24 (5.3%)[a]
Delivery Method			
Vaginal del.	57 (38.6%)	209 (50.1%)	124 (26.1%)
C sec.	143 (61.4%)[c]	205 (49.9%)[a]	367 (73.9%)[b]
Fetal Pre.			
Vertex	184 (89%)	364 (88.1%)	448 (92.7%)
Unspecified	16 (11%)[a]	39 (11.9%)[a]	43 (7.3%)[a]

Data are expressed as number (%) and analyzed with the chi-square test. Equal superscript letters denote a subgroup whose column rates are not significantly different from each other at the adjusted p-value with Bonferroni correction (p>0.05).

According to Table 2, the incidence of gestational diabetes was significantly lower in the adolescent group than in the other groups (p<0.05). Conversely, the advanced aged group had a higher incidence of gestational diabetes, although this difference was not statistically significant (p>0.05). Gestational hypertension and acute fetal distress were more common in the advanced aged group, although this difference was not statistically significant (p>0.05). The rates of gestational hypertension and acute fetal distress were similar between the adolescent and older women groups (p>0.05). Preeclampsia was significantly more common in the older women group compared to the adolescent and control groups (p<0.05). There was no significant difference in the incidence of placental abruption and placenta previa between the study groups (p>0.05). The incidence of premature rupture of membranes was significantly lower in the elderly women group compared to the adolescent group (p<0.05).

Table 2: Obstetrical complications			
	Controls (n=200)	Adolescents (n=403)	Age >40 (n=491)
Gestational diabetes			
No	183 (95.3%)	401 (98.8%)	449 (90%)
Yes	17(4.7%)[b]	2 (1.2%)[a]	42 (10%)[b]
Gestational hypertension			
No	195 (96.7%)	363 (90%)	448 (89%)
Yes	5 (3.3%)[a]	40 (10%)	43 (11%)[b]
Preeclampsia			
No	192 (94.7%)	390 (94.2%)	446 (89.5%)
Yes	8 (5.3%)	13 (5.8%)[a]	45 (10.5%)[b]
Placental abruption			
No	198 (98.7%)	402 (99.8%)	480 (98.1%)
Yes	2 (1.3%)[a]	1 (0.2%)[a]	11 (1.9%)[a]
Placenta previa			
No	196 (97.3%)	398 (98.8%)	479(97.4%)
Yes	4 (2.7%)[a]	5 (1.2%)[a]	12 (2.6%)[a]
Premature membrane rupture			
No	192 (94.7%)	379 (91.5%)	473 (95.8%)
Yes	8 (5.3%)	24 (8.5%)[a]	18 (4.2%)[b]
Acute fetal distress			
No	196 (97.3%)	379 (91.5%)	443 (88.8%)
Yes	4 (2.7%)[a]	24 (8.5%)[a ,b]	48 (11.2%)[b]

Data are expressed as number (%) and analyzed with the chi-square test. Equal superscript letters denote a subgroup whose column rates are not significantly different from each other at the adjusted p-value with Bonferroni correction (p>0.05).

Table 3 presents the results of neonates in the adolescent, older women, and control groups. The birth weight of infants in the adolescent group was significantly lower compared to the other groups (p<0.05). There was no statistically significant difference between the birth weight of infants in the control and older women groups (p>0.05). The rate of early preterm labor, defined as delivery before 34 weeks of gestation, was significantly higher in the adolescent group than in the other groups (p<0.05). The rate of premature preterm birth was not significant in the elderly women group (p>0.05). Although the rate of preterm delivery was higher in the older women group, there was no significant difference between the groups (p>0.05).

Table 3: Neonate results

	Controls (n=200)	Adolescents (n=403)	Age >40 (n=491)
Fetal anomaly			
No	196 (98%)	397 (98.3%)	471 (97.9%)
Yes	4 (2%)[a]	6 (1.7%)[a]	19 (2.1%)[a]
Gender			
Female	91 (42.5%)[a]	198 (47%)[a]	243 (49.4%)[a]
Male	108 (57.5%)	205 (53%)	248(50.6%)
Weight			
<1500gr	9 (6%)	41 (9.9%)	22 (5.1%)
>4000gr	10 (6.6%)	15 (3.6%)	47 (10.9%)
Weight, g	3020±786.1	2745±808.1	3101±826.9
Gestational age			
<34 weeks	20 (13.3%)[b]	116 (28%)[a]	70 (16.4%)[b]
>34 weeks	130 (86.7%)	298 (72%)	358 (83.6%)
Weeks, w	38±3.1	36.36±3.9	36.73±3.3
Apgar 1 min.	8.5±1.5	7.75±2.1	8.91±2
Apgar 5 min.	10±1.5	7.73±4.5	8.7±2.2

Data are expressed as number (%) and analyzed with the chi-square test. Equal superscript letters denote a subgroup whose column rates are not significantly different from each other at the adjusted p-value with Bonferroni correction (p>0.05).

Table 4: Multivariate analysis of clinical variables in the adolescents and women of advanced age

	Adolescents Odds Ratio	Adolescents Significance	Women of Advanced Age Odds Ratio	Women of Advanced Age Significance
Parity (nulliparity)	2.4	< 0.001	0.3	< 0.001
Cesarean section (yes/no)	0.8	0.01	1.2	0.004
Gestational diabetes	0.2	0.004	N/A	N/A
Gestational hypertension	2.5	0.02	2.8	0.009
Acute fetal distress	3.1	0.02	4.1	0.002
Gestational age(≤34 weeks)	1.9	0.002	N/A	N/A
Stillbirth (yes/no)	N/A	N/A	3.9	0.04

**Factors are listed in the first column, followed by the odds ratio and significance for adolescents, and then for women of advanced age. If a factor is not applicable to one group, it is marked as "N/A".*

Table 5: Binary logistic regression coefficients of age groups by independent variables.

Independent variables	B	SE	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Cesarean section	0.576	0.201	8.249	1	0.004	1.779	1.201	2.635
	0.461	0.168	7.571	1	0.006	1.586	-	-
Gestational hypertension	1.109	0.444	6.242	1	0.012	3.032	1.270	7.237
	−3.178	0.417	58.176	1	0.000	0.042	-	-
Gestational age (<34 weeks)	−0.222	0.274	0.655	1	0.418	0.801	0.468	1.371
	1.872	0.240	60.730	1	0.000	6.500	-	-
MulGple pregnancy	−0.783	0.549	2.036	1	0.154	0.457	0.156	1.340
	−3.178	0.417	58.176	1	0.000	0.042	-	-
Stillbirth	1.389	0.745	3.477	1	0.062	4.010	0.932	17.261
	−4.304	0.712	36.556	1	0.000	0.014	-	-
Female gender	−0.277	0.193	2.073	1	0.150	0.758	0.519	1.105
	0.311	0.166	3.522	1	0.061	1.365	-	-

Discussion

Furthermore, gestational diabetes was found to be significantly lower in adolescents compared to older women, while preeclampsia was significantly higher in older women. Premature rupture of membranes was significantly lower in older women compared to adolescents. Adolescents had significantly lower birth weight and higher rates of early preterm labor compared to the other groups.[5] These findings indicate that maternal age plays a significant role in perinatal outcomes, with advanced maternal age being associated with a higher risk of adverse outcomes.[6] It is important to consider these findings in clinical practice when providing care for pregnant women, particularly those in advanced maternal age. During the planning of our study, we conducted a literature search and found that similar outcomes have been observed in groups with nulliparity, no previous cesarean section, low birth weight, and preterm birth.

[5]The trend of giving birth at an older age due to the work environment has led to an increased incidence of pregnancy complications, including stillbirth, cesarean section, preterm delivery, and gestational hypertension. [7] We also found a study that drew attention to the fact that maternal age was directly proportional to complications such as preterm birth, neonatal loss, and congenital anomalies.[8] These findings highlight the importance of studying the effects of maternal age on perinatal outcomes. [9]A previous study had categorized adolescent and older women pregnancies as high-risk, which differs from our study where we formed three groups, including a control group.[10] In Turkey, studies have shown that advanced-age pregnancies have higher rates of preterm births and stillbirths, but with no statistical significance. [11] We attribute the significant results in our study to our definition of advanced-age pregnancies as 40 years and older.[12] It is reasonable to assume that as gestational age increases, abnormalities in the uterus and placenta that affect the reproductive system have a greater impact.

Conclusion

As part of our country's healthcare policy, reducing maternal and infant mortality rates is a primary goal. Achieving this goal requires the concerted efforts of obstetricians and pediatricians, as well as improvements in perinatal care. Our study provides valuable information that can assist both patients and healthcare professionals in identifying the various risk factors associated with pregnancy, particularly those related to maternal age, and developing effective strategies to prevent avoidable complications. The results of our study can be utilized to guide interventions and improve perinatal care, such as better monitoring and management of high-risk pregnancies, providing appropriate counseling and education to mothers about the risks associated with advanced maternal age, and enhancing access to prenatal care services. With this knowledge, we hope to contribute to the overall effort of improving the health and well-being of both mothers and infants in our community.

Authorship Contribution

Idea/Hypothesis: MS, KS, MB, EG, MO Design: MS, KS, MB, EG, MO Data collection/Data processing: MS, KS, MB, EG Data Analysis: MS, KS, MB, EG, MO Preparation of the article: MS, KS, MB, EG, MO

Ethics Committee Approval

This research was approved by the Ethics Committee of Afyon , in accordance with the Research and Publication Ethics, with the decision of the board numbered 2030-KAEK-2 /141.

Informed Consent

Consents were obtained from the patients.

Peer Review

Evaluated by independent reviewers working in two different institutions appointed by the field editor.

Conflict of Interest

No conflict of interest was declared by the authors.

Financial Disclosure

No financial support

Referances

1. Walker KF, Thornton JG. Timing and mode of delivery with advancing maternal age. Best Pract Res Clin Obstet Gynaecol 2021;70. https://doi.org/10.1016/j.bpobgyn.2020.06.005.
2. Schildberger B, Linzner D, Hehenberger L, Leitner H, Pfeifer C. Influence of Maternal Age on Selected Obstetric Parameters. Geburtshilfe Frauenheilkd 2019;79. https://doi.org/10.1055/a-0859-0826.
3. Londero AP, Rossetti E, Pittini C, Cagnacci A, Driul L. Maternal age and the risk of adverse pregnancy outcomes: A retrospective cohort study. BMC Pregnancy Childbirth 2019;19. https://doi.org/10.1186/s12884-019-2400-x.
4. Frick AP. Advanced maternal age and adverse pregnancy outcomes. Best Pract Res Clin Obstet Gynaecol 2021;70. https://doi.org/10.1016/j.bpobgyn.2020.07.005.
5. Mezmur H, Assefa N, Alemayehu T. Teenage pregnancy and its associated factors in eastern ethiopia: A community-based study. Int J Womens Health 2021;13. https://doi.org/10.2147/IJWH.S287715.
6. Rohmah N, Yusuf A, Hargono R, Laksono AD, Masruroh, Ibrahim I, et al. Determinants of teenage pregnancy in Indonesia. Indian Journal of Forensic Medicine and Toxicology 2020;14. https://doi.org/10.37506/ijfmt.v14i3.10736.
7. Attali E, Yogev Y. The impact of advanced maternal age on pregnancy outcome. Best Pract Res Clin Obstet Gynaecol 2021;70. https://doi.org/10.1016/j.bpobgyn.2020.06.006.
8. Tigabu S, Liyew AM, Geremew BM. Modeling spatial determinates of teenage pregnancy in Ethiopia; geographically weighted regression. BMC Womens Health 2021;21. https://doi.org/10.1186/s12905-021-01400-7.
9. Cook SM, Cameron ST. Social issues of teenage pregnancy. Obstet Gynaecol Reprod Med 2020;30. https://doi.org/10.1016/j.ogrm.2020.07.006.
10. Hadley A. Teenage pregnancy: strategies for prevention. Obstet Gynaecol Reprod Med 2020;30. https://doi.org/10.1016/j.ogrm.2020.10.004.
11. Karaçam Z, Kizilca Çakaloz D, Demir R. The impact of adolescent pregnancy on maternal and infant health in Turkey: Systematic review and meta-analysis. J Gynecol Obstet Hum Reprod 2021;50. https://doi.org/10.1016/j.jogoh.2021.102093.
12. El Kak F. Maternal health under crisis: The morbidity syndrome. Int J Gynecol Obstet 2018;143.

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/ 10.31067/acusaglik.1312484

Skin Diseases in Geriatric Patients: One-year Single Center Experience

Sevgi KULAKLI[1]

[1]Giresun University, Faculty of Medicine, Department of Dermatology and Veneorology, Giresun, Turkey.

Sevgi KULAKLI
0000-0001-7886-1060

Correspondence: Sevgi Kulakli
Aksu District Mehmet İzmen Street No:145
Merkez/Giresun
Phone: +90 505 912 86 96
E-mail: sevgi.c@gmail.com

Received: 10.06.2023
Accepted: 27.12.2023

ABSTRACT

Purpose: The aim of this study was to investigate the distribution and frequency of skin diseases in the geriatric age group, as well as the variation of this frequency according to age, sex, and season.

Methods: Data from 1039 geriatric patients admitted to our dermatology clinic between January 1, 2022 and January 1,2023 were retrospectively analysed according to sex, age and seasons.

Results: The five most frequently observed disease groups in elderly patients were eczematous dermatitis (22.4%), fungal infections (14.4%), infestations (10.1%), pruritus (6.9%), and premalignant skin lesions (6.4%). The most common five dermatologic diseases in all patients were contact dermatitis (11.16%), scabies (8%), tinea ungium (6.8%), actinic keratosis (6.1%), and generalized pruritus (6.1%), respectively. Generalized pruritus was significantly less frequent in the 65-74 age group compared with the other two groups ($p<0.001$), whereas fungal infections were significantly more frequent ($p=0.001$). Malignant lesions were significantly more frequent in the age group ≥85 years than in the other two groups ($p<0.001$). The incidence of skin ulcers was significantly higher in the age group ≥85 than in the age group 65-74 ($p=0.04$).

Conclusion: This study revealed a high incidence of scabies in the elderly population, which is an uncommon finding compared to previous studies. This increase reflects the rising incidence of scabies in our country in recent years. Increased awareness of skin diseases among the elderly can contribute to preventive medicine, early diagnosis, and timely treatment of these conditions.

Keywords: geriatrics, skin diseases, skin aging, dermatology

ÖZET

Amaç: Bu çalışmanın amacı, geriatrik yaş grubunda deri hastalıklarının dağılımı ve sıklığı ile bu sıklığın yaşa, cinsiyete ve mevsimlere göre değişimini incelemektir.

Yöntemler: 1 Ocak 2022 ile 1 Ocak 2023 tarihleri arasında dermatoloji kliniğine başvuran 1039 geriatrik hastanın verileri cinsiyet, yaş ve mevsimlere göre retrospektif olarak analiz edilmiştir.

Bulgular: Yaşlı hastalarda en sık görülen beş hastalık grubu egzematöz dermatit (%22,4), mantar enfeksiyonları (%14,4), infestasyonlar (%10,1), generalize kaşıntı (%6,9) ve premalign deri lezyonları (%6,4) idi. Tüm hastalarda en sık görülen beş dermatolojik hastalık sırasıyla kontakt dermatit (%11,16), skabiez (%8), tinea ungium (%6,8), aktinik keratoz (%6,1) ve generalize kaşıntıydı (%6,1). 65-74 yaş grubunda diğer iki gruba göre generalize kaşıntı anlamlı olarak daha az ($p<0,001$), mantar enfeksiyonları ise anlamlı olarak daha fazlaydı ($p=0,001$). Malign lezyonlar ≥85 yaş grubunda diğer iki gruba göre anlamlı olarak daha sıktı ($p<0,001$). Deri ülseri insidansı ≥85 yaş grubunda 65-74 yaş grubuna göre anlamlı olarak yüksekti ($p=0,04$).

Sonuç: Bu çalışmada önceki çalışmalardan farklı olarak yaşlı popülasyonda skabiez görülme sıklığı oldukça yüksek bulunmuştur. Bu durum ülkemizde uyuz insidansının son yıllardaki artışını yansıtmaktadır. Yaşlılarda görülen deri hastalıkları konusunda artan farkındalık, hastalıkların hem önlenmesinde hem de erken tanı ve tedavisinde olumlu sonuçlar doğuracaktır.

Anahtar kelimeler: geriatri, deri hastalıkları, deri yaşlanması, dermatoloji

Aging is an unavoidable process that impacts all organ systems, including the skin. Skin aging is an intricate process characterized by morphological and chemical changes that affect various layers of the skin, depending on intrinsic and extrinsic factors. Intrinsic aging primarily involves a decrease and deceleration in cell replacement, barrier function, wound healing, immunological responses, thermoregulation, and vitamin D production capacity. As individuals age, the epidermis and dermis become thinner, the number of melanocytes and fibroblasts decrease, and the functions of sweat and sebaceous glands diminish. On the other hand, extrinsic aging is caused by environmental factors such as UV radiation, air pollution, lifestyle choices, and dietary habits. The principal contributor to extrinsic aging is oxidative damage resulting from increased production of free radicals. Aging skin exhibits thin and deep wrinkles, dryness, delayed wound healing, reduced skin elasticity, sagging, pigmented spots, telangiectasias, and benign neoplasms (1). Although accepted as a natural physiological process, these changes can potentially contribute to the development of certain skin conditions such as xerotic eczema, pruritus, and skin ulcers (2).

Individuals who are 65 years and older are categorized as the geriatric population. Presently, there has been a rise in the elderly population in both developed and developing nations. The global geriatric population increased from 703 million (6% of the total population) in 2019 to 727 million (9.3% of the total population) in 2020. By 2050, the geriatric population is projected to constitute 16% of the global population (3). The gradual growth of the elderly population heightens the significance and relevance of diseases occurring in this age group (4).

The objective of this study was to examine the prevalence and distribution of skin diseases among the geriatric age group, while also exploring how this prevalence varies based on age, gender, and season.

Material and Methods

Ethical aspects

The present study was conducted according to the Declaration of Helsinki and approved by the Clinical Research and Ethics Committee linked to Giresun University Faculty of Medicine (approval number: 12, date: 07.02.2023).

Study design

In this retrospective cohort study, we analysed the patients aged ≥65 years who applied to our dermatology outpatient clinic between January 1, 2022 and January 1,2023.

The exclusion criteria are as follows: *i)* patients <65 years, *ii)* patients with inadequate data in medical records, iii) patients without a definite diagnosis, *iv)* recurrent applications of the same patient.

A total of 1039 geriatric patients were examined and sex, age, season of admittance, concomitant systemic diseases, diagnosis, duration and location of disease were recorded. The patients were classified according to sex, age (65-74, 75-84, and ≥85) and dermatologic diagnoses. These diagnoses were categorised into 22 groups including generalized pruritus, papulosquamous diseases, fungal infections, bacterial infections, viral infections, infestations, benign neoplasia, precancerous lesions, malign neoplasia, vesiculobullous diseases, eczematous dermatitis, disorders of skin appendages, cutaneous lymphomas, immune-rheumatic diseases, urticaria, acneiform diseases, drug eruptions, mucous membrane diseases, cutaneous ulcers, callus, xerosis, and others.

Statistical analyses

Statistical analyses were performed using the Statistical Package for Social Sciences for Windows version 21.0 (SPSS, Chicago, IL, USA). Categorical variables were studied as percentages and were compared using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results

Of the 8087 patients who presented to the dermatology outpatient clinic between January 1, 2022, and January 1, 2023, 1039 (12.85%) were over 65 years of age. Of these patients, 535 (51.5%) were female and 504 (48.5%) were male. The mean age was 78,56 ± 8,29 for women, 75,16 ± 7,07 for men, and 74,38 ± 7,47 years for all participants. Based on the age groups, 616 (59.3%) patients were in the 65-74 age group (302 female, 314 male), 298 (28.7%) patients were in the 75-84 age group (158 female, 140 male), and 125 (12%) patients were in the over-85 age group (75 female, 50 male).

The duration of the disease ranged from 1 day to 80 years. The season with the highest number of outpatient visits was autumn (313 patients, 30.1%). Autumn was followed

by summer (268 patients, 25.7%), winter (234 patients, 22.5%), and spring (224 patients, 21.6%). At least one systemic disease was present in 78.3% (812 patients) of patients. The five most common concomitant systemic diseases were hypertension (454 patients, 43.8%), diabetes mellitus (DM) (260 patients, 25%), other cardiovascular diseases (210 patients, 20.2%), pulmonary diseases (105 patients, %.) 10.1) and neurological diseases (79 patients, 7.6%).

In 24.4% (253 patients) of the patients, the lesions were distributed over the entire body. This was followed by the lower extremities (191 patients, 18.4%), face (157 patients, 15.1%), and trunk (142 patients, 13.7%) in order of frequency.

The first five groups of diseases most frequently observed in patients were eczematous dermatitis (22.4%), fungal infections (14.4%), infestations (10.1%), generalized pruritus (6.9%), and premalignant skin lesions (6.4%).

The most frequent types of eczematous dermatitis were contact dermatitis (49.8%), seborrheic dermatitis (13.7%), intertriginous dermatitis (%9.4), stasis dermatitis (8.15%), and xerotic eczema (5.15%), respectively. The distribution of fungal infections was tinea ungium (47.3%), tinea pedis (31.3%), tinea corporis (6.6%), tinea incognito (4.6%), tinea cruris (3.3%), tinea versicolor (3.3%), candidiasis (3.3%), and tinea manum (2.6%). Seventy-nine percent of infestations were scabies, 19.1% were mite infestations, 0.95% were pediculosis capitis, and 0.95% were demodicosis. The premalignant skin lesions were actinic keratosis (6.1%) and Bowen disease (0.2%).

Dermatitis and cutaneous lymphomas were significantly more common in men than women (p=0.004 and 0.027, respectively). There was a significant difference between the three age groups in terms of generalized pruritus, fungal infections, premalignant lesions, malignant lesions and cutaneous ulcers (p<0.001, p=0.001, 0.014, 0.00 and 0.021, respectively). Generalized pruritus was significantly less frequent in the 65-74 age group compared with the other two groups (p<0.001), whereas fungal infections were significantly more frequent (p=0.001). While there was no difference between the age group ≥85 and the other two groups in the frequency of premalignant lesions, it was significantly higher in the age group 74-84 than in the age group 65-74 (p=0.003). Malignant lesions were significantly more frequent in the age group ≥85 years than in the other two groups (p<0.001). The incidence of skin ulcers was significantly higher in the age group ≥85 than in the age group 65-74 (p=0.04). It was found that the number of patients diagnosed with urticaria was higher in summer (p=0.035), and the number of patients diagnosed with malignant skin lesions was higher in autumn than in other seasons (p=0.022). There was no seasonal difference in terms of other disease groups. Distribution of skin diseases according to sex, age groups and season are shown in Tables 1, 2, and 3, respectively.

Table 1. Distribution of skin diseases according to sex

	Female, n (%)	Male, n (%)	Total, n (%)	*p*
Eczematous dermatitis	101 (18,9)	132 (26,2)	233 (22,4)	***0.004****
Fungal infections	85 (15,9)	65 (12,9)	150 (14,4)	*0.122**
Infestations	53 (9,9)	52 (10,3)	105 (10,1)	*0.83**
Generalized pruritus	38 (7,1)	34 (6,7)	72 (6,9)	*0.92**
Premalignant skin lesions	37 (6,9)	30 (6)	67 (6,4)	*0.527**
Papulosquamous diseases	33 (6,2)	28 (5,6)	61 (5,9)	*0.778**
Viral infections	25 (4,7)	31 (6,2)	56 (5,4)	*0.296**
Benign skin neoplasia	35 (6,5)	20 (4)	55 (5,3)	*0.064**
Urticaria	20 (3,7)	11 (2,2)	31 (3)	*0.141**
Malign skin neoplasia	17 (3,2)	13 (2,6)	30 (2,9)	*0.565**
Callus	15 (2,8)	11 (2,2)	26 (2,5)	*0.522**
Xerosis cutis	9 (1,7)	15 (3)	24 (2,3)	*0.165**
Acne and acneiform skin lesions	8 (1,5)	13 (2,6)	21 (2)	*0.215**
Bacterial infections	6 (1,1)	13 (2,6)	19 (1,8)	*0.08**
Immune-rheumatic diseases	8 (1,5)	5 (1)	13 (1,3)	*0.466**
Cutaneous ulcers	8 (1,5)	4 (0,8)	12 (1,2)	*0.29**
Drug eruptions	4 (0,7)	3 (0,6)	7 (0,7)	*0.533***
Disorders of skin appendages	4 (0,7)	2 (0,4)	6 (0,6)	*0.687***
Cutaneous lymphomas	0 (0)	5 (1)	5 (0,5)	***0.027****
Mucous membrane disorders	2 (0,4)	2 (0,4)	4 (0,4)	*0.665***
Vesiculobullous diseases	3 (0,6)	1 (0,2)	4 (0,4)	*0.625***
Others	24 (4,5)	14 (2,8)	38 (3,7)	*0.186**

**Pearson's chi-square test, **Fisher' exact test. Significant P values are shown in bold.*

Table 2. Distribution of skin diseases according to age groups

	65-74years n (%)	75-84 years n (%)	≥85 years n (%)	Total n (%)	*p*
Eczematous dermatitis	139 (22,6)	68 (22,8)	26 (20,8)	233 (22,4)	*0.91**
Fungal infections	108 (17,5)	33 (11,1)	9 (7,2)	150 (14,4)	***0.001****
Infestations	60 (9,7)	32 (10,7)	13 (10,4)	105 (10,1)	*0.91**
Genaralized pruritus	26 (4,2)	32 (10,7)	14 (11,2)	72 (6,9)	***0.00****
Premalignant skin lesions	29 (4,7)	29 (9,7)	9 (7,2)	67 (6,4)	***0.014****
Papulosquamous diseases	45 (7,3)	10 (3,4)	6 (4,8)	61 (5,9)	*0.06**
Viral infections	35 (5,7)	17 (5,7)	4 (3,2)	56 (5,4)	*0.462**
Benign skin neoplasia	38 (6,2)	10 (3,4)	7 (5,6)	55 (5,3)	*0.202**
Urticaria	20 (3,2)	9 (3)	2 (1,6)	31 (3)	*0.614**
Malign skin neoplasia	10 (1,6)	8 (2,7)	12 (9,6)	30 (2,9)	***0.00****
Callus	16 (2,6)	8 (2,7)	2 (1,6)	26 (2,5)	*0.786**
Xerosis cutis	12 (1,9)	8 (2,7)	4 (3,2)	24 (2,3)	*0.612**
Acne and acneiform skin lesions	16 (2,6)	5 (1,7)	0 (0)	21 (2)	*0.15**
Bacterial infections	11 (1,8)	5 (1,7)	3 (2,4)	19 (1,8)	*0.873**
Immune-rheumatic diseases	9 (1,5)	5 (1,7)	1 (0,8)	13 (1,3)	*0.92***
Cutaneous ulcers	3 (0,5)	5 (1,7)	4 (3,2)	12 (1,2)	***0.021****
Drug eruptions	4 (0,6)	2 (0,7)	1 (0,8)	7 (0,7)	*1***
Disorders of skin appendages	5 (0,8)	1 (0,3)	0 (0)	6 (0,6)	*0.719***
Cutaneous lymphomas	5 (0,8)	0 (0)	0 (0)	5 (0,5)	*0.245***
Mucous membrane disorders	2 (0,3)	2 (0,7)	0 (0)	4 (0,4)	*0.761***
Vesiculobullous diseases	2 (0,3)	1 (0,3)	1 (0,8)	4 (0,4)	*0.587***
Others	21 (3,4)	10 (3,4)	7 (5,6)	38 (3,7)	*0.422**

**Pearson's chi-square test, **Fisher' exact test. Significant P values are shown in bold.*

Table 3. Distribution of skin diseases according to season.

	Winter n (%)	Spring n (%)	Summer n (%)	Autumn n (%)	Total n (%)	*p*
Eczematous Dermatitis	46 (19,7)	41 (17,6)	65 (27,9)	81 (34,8)	233 (100)	*0.127**
Fungal infections	31 (20,7)	37 (24,7)	40 (26,7)	42 (28)	150 (100)	*0.636**
Infestations	20 (19)	19 (18,1)	28 (26,7)	38 (36,2)	105 (100)	*0.3**
Genaralized pruritus	21 (29,2)	14 (19,4)	13 (18,1)	24 (33,3)	72 (100)	*0.377**
Premalignant skin lesions	20 (29,9)	16 (23,9)	10 (14,9)	21 (31,3)	67 (100)	*0.158**
Papulosquamous diseases	19 (31,1)	11 (18)	19 (31,1)	12 (19,7)	61 (100)	*0.095**
Viral infections	15 (26,8)	15 (26,8)	10 (17,9)	16 (28,6)	56 (100)	*0.274**
Benign skin neoplasia	7 (12,7)	19 (34,5)	15 (27,3)	14 (25,5)	55 (100)	*0.058**
Urticaria	5 (16,1)	4 (12,9)	15 (48,4)	7 (22,6)	31 (100)	***0.035****
Malign skin neoplasia	3 (10)	3 (10)	8 (26,7)	16 (53,3)	30 (100)	***0.022****
Callus	6 (23,1)	6 (23,1)	6 (23,1)	8 (30,8)	26 (100)	*0.99**
Xerosis cutis	7 (29,2)	7 (29,2)	4 (16,7)	6 (25)	24 (100)	*0.542**
Acne and acneiform skin lesions	8 (38,1)	5 (23,8)	5 (23,8)	3 (14,3)	21 (100)	*0.238***
Bacterial infections	4 (21,1)	6 (31,6)	4 (21,19	5 (26,3)	19 (100)	*0.778***
Immune-rheumatic diseases	4 (30,8)	2 (15,4)	4 (30,8)	3 (23,1)	13 (100)	*0.81***
Cutaneous ulcers	4 (33,3)	1 (8,3)	4 (33,39	3 (25)	12 (100)	*0.586***
Drug eruptions	3 (42,9)	3 (42,9)	1 (14,3)	0 (0)	7 (100)	*0.084***
Disorders of skin appendages	0 (0)	2 (33,3)	2 (33,3)	2 (33,3)	6 (100)	*0.646***
Cutaneous lymphomas	1 (20)	3 (60)	1 (20)	0 (0)	5 (100)	*0.139***
Mucous membrane disorders	3 (75)	0 (0)	0 (0)	1 (25)	4 (100)	*0.083***
Vesiculobullous diseases	1 (25)	0 (0)	1 (25)	2 (50)	4 (100)	*0.9***
Others	6 (15,8)	10 (26,3)	13 (34,2)	9 (23,7)	38 (100)	*0.33**

**Pearson's chi-square test, **Fisher' exact test. Significant P values are shown in bold.*

The most common five dermatologic diseases in all patients were contact dermatitis (11.16%), scabies (8%), tinea ungium (6.8%), actinic keratosis (6.1%), and generalized pruritus (6.1%), respectively. The five most frequent diseases in women were contact dermatitis (11.7%), scabies (7.9%), tinea ungium (7.9%), actinic keratosis (6.4%) and psoriasis (4.7%). In men, they were contact dermatitis (12.7%), scabies (8.1%), generalized pruritus (6.2%), actinic keratosis (5.8%), and tinea ungium (5.6%).

Discussion

With the global average life expectancy on the rise, it has become increasingly important to identify health issues in geriatric patients, facilitate early diagnosis, and provide appropriate treatment. These efforts not only enhance their quality of life but also contribute to reducing healthcare expenses (4). Based on data from 2020, individuals aged 65 years and older account for 9.3% of the global population and 9.5% of the population in Turkey (3,5). In this particular study, it was observed that individuals aged 65 and older comprised 12.85% of the patients who visited the outpatient clinic in the past year.

The study identified the five most prevalent skin conditions as eczematous dermatitis, fungal infections, infestations, generalized pruritus, and premalignant skin lesions. A similar study conducted by Yalçın et al. in 2006 reported a similar ranking, with eczematous dermatitis, fungal infections, pruritus, bacterial infections, and viral infections being the most common (6). In another study from eastern Turkey in 2012, the most common skin diseases in this age group were eczematous dermatitis, fungal infections, pruritus, urticaria-angioedema, and bacterial infections (7). Furthermore, a study conducted in 2017, which included 7,092 patients, observed a similar pattern with eczematous dermatitis, fungal infections, pruritus, premalignant and malignant skin lesions, and xerosis cutis being the most prevalent conditions (8). It is notable that eczematous dermatitis and fungal infections consistently emerged as the two most common diseases across all these studies, including the present one.

Various studies have reported that the incidence of eczematous dermatitis in the elderly ranges from 17.1% to 37.7% (6-10). In this study, the frequency of eczematous dermatitis was found to be 22.4%. Contact dermatitis was identified as the most common type of eczematous dermatitis in this study as well as in the other three studies (6-8). Aging brings about several changes in both the innate and adaptive immune systems. Referred to as "immunoaging," these changes include increased receptor density in immune cells, higher numbers of memory T cells, elevated production of proinflammatory cytokines such as interleukin (IL)-1, IL-2, IL-6, IL-12, IL-15, IL-18, IL-22, IL-23, tumor necrosis factor (TNF)-α, and interferon (IFN)-γ, reduced phagocytosis by neutrophils, diminished numbers of naive T cells, decreased production and function of B cells, as well as dysfunction of monocytes and macrophages. These alterations contribute to decreased resistance against infectious diseases, a predisposition to cancer development, and an increased susceptibility to autoimmune diseases among elderly patients. The combination of immunoaging and skin dryness, along with a decline in skin barrier function, increased transepidermal water loss, reduced epidermal cell regeneration, thinning of the epidermis, prolonged exposure to allergens, and diminished elimination of allergenic substances, creates a propensity for the development of contact dermatitis in the elderly (4). Similar to the findings of Bilgili et al. and Yaldiz, this study also observed a significantly higher prevalence of eczematous dermatitis in male patients compared to females. This difference could be attributed to the fact that males in this age group tend to spend more time outdoors, leading to increased exposure to allergens and irritants. Additionally, they may not adhere as strictly to personal care recommendations, such as regular use of moisturizers.

Fungal infections ranked as the second most prevalent skin condition in this study, consistent with the findings of the other three studies. While tinea pedis was reported as the most common fungal infection in the other studies, the most frequent type in this study was tinea ungium, followed by tinea pedis. Apart from immunoaging, the increase in fungal infections with age can be attributed to factors such as thinning of the epidermis, decreased barrier function, compromised skin integrity that makes it susceptible to minor trauma, and a higher incidence of concomitant diseases like DM and peripheral vascular disease (11). In this study, it was found that 78.3% of patients had at least one systemic disease, and 25% of the patients had DM. These underlying systemic conditions may contribute to the higher occurrence of fungal infections in the geriatric population.

In this study, a noteworthy deviation from other studies was observed, as generalized pruritus was replaced by scabies infestation. Additionally, when examining the subgroups of diseases, it was found that scabies ranked as the second most common skin disease after contact dermatitis. It has been reported that the incidence of scabies

in Turkey experienced a significant increase, with a 7-fold rise in 2018 and a further 30-fold increase in 2019 compared to the numbers in 2017 (12). This surge in scabies cases in our country in recent years explains why infestation, which was not among the top five skin diseases in previous studies, emerged as the third most common skin disease in this study.

Pruritus is a commonly experienced symptom among the elderly. The incidence of pruritus in the elderly varies between 2% and 14.2% according to various studies (6-10). In this study, the incidence of generalized pruritus was found to be 6.9%. Dry skin is the leading cause of pruritus in the elderly. Alongside dryness, systemic comorbidities such as DM, thyroid disease, chronic liver and kidney disease, malignancies, anemia, multiple drug usage, and stress are major contributors to pruritus in this age group (13). The study also identified that generalized pruritus was significantly less common in the 65-74 age group compared to the other two age groups, suggesting that the incidence of pruritus increases with age.

The risk of developing skin cancer increases as individuals age. Factors such as immunoaging, decreased DNA repair capacity, cumulative lifetime exposure to carcinogens, and increased ultraviolet (UV) exposure contribute to this heightened risk (1). In various studies, the frequency of premalignant and malignant skin lesions among individuals over the age of 65 has been reported to range from 1.2% to 9.7% (6-8, 10). In this particular study, the incidence was found to be 9.3%. Consistent with the understanding that the risk of skin cancer increases with age, this study revealed that the occurrence of premalignant lesions was significantly higher in the 74-85 age group compared to the 65-74 age group. Furthermore, malignant skin lesions were significantly more prevalent in the age group exceeding 85 years compared to the other two age groups.

Among elderly patients, leg ulcers and pressure ulcers resulting from circulatory failure are the most frequent causes of cutaneous ulcers. The aging process leads to a decrease in skin regeneration and impaired wound healing. Additionally, systemic conditions like arterial and venous insufficiency, neuropathy, DM, chronic kidney disease, malignancy, immobility, and malnutrition contribute to the development of ulcers on the skin (14,15). In this study, it was observed that the incidence of cutaneous ulcers was higher among patients in the older age group. This finding aligns with the understanding that the risk of developing ulcers increases as individuals age.

In this study, it was observed that patients with urticaria tended to seek medical attention more frequently during the summer, while patients with malignant skin tumors were more commonly detected in the autumn. The higher incidence of malignant skin tumors in the fall can be attributed to the seasonal pattern of patient visits, with autumn being the most common time for seeking medical care. Regarding the seasonal distribution of urticaria, there are limited studies available in the literature. One study reported a higher frequency of urticaria during the summer, while another study indicated a higher frequency during winter (16,17). In the current study, the increased occurrence of urticaria in the summer could be attributed to hazelnut harvesting, which takes place during this season in the region. Furthermore, people may have increased exposure to outdoor allergens due to spending more time in fields and gardens during the summer. It is important to acknowledge the limitations of the present study, including its single-center nature and retrospective design. However, a notable strength of the study is its large sample size.

Conclusion

This study offers valuable data on the prevalence of dermatologic diseases in elderly patients. A notable finding in this study, which distinguishes it from previous research, is the high incidence of scabies among the elderly population. This highlights the increasing occurrence of scabies in our country in recent years. Consequently, elderly patients presenting with itching symptoms should be screened for scabies.

As the elderly population continues to grow worldwide, there is an increasing focus on understanding and addressing the specific diseases and healthcare needs of this age group. As demonstrated in this study, although the most common skin diseases in elderly patients may not directly affect life expectancy, they significantly impact the quality of life. Preventive measures play a crucial role in reducing the incidence of these diseases, and it is essential to provide necessary education to the elderly, caregivers, and primary care physicians. This education should cover disease prevention, as well as early diagnosis and treatment, in order to improve outcomes and maintain a higher quality of life for elderly individuals.

Declarations

Funding

No funding.

Conflicts of Interest

The author has no conflict of interest to disclose.

Ethics approval

The study was conducted according to the Helsinki Declaration for Ethical Principles of Research. Approval was obtained from the Ethics Committee linked to Giresun University Faculty of Medicine (approval number: 12, date: 07.02.2023).

Availability of Data and Material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

SK: Design, data collection, analysis and writing.

References

1. Böne F, Girard D, Archambault JC, et al. Skin Changes During Ageing. Subcell Biochem. 2019;91:249-80. doi: 10.1007/978-981-13-3681-2_10.
2. Norman RA. Xerosis and pruritus in the elderly: recognition and management. Dermatol Ther. 2003;16(3):254-9. doi: 10.1046/j.1529-8019.2003.01635.x.
3. United Nations, Department of Economic and Social Affairs. World population aging 2020 highlights. 2020. Available from: https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/undesa_pd-2020_world_population_ageing_highlights.pdf. Accessed May 19, 2023.
4. Lima AL, Timmermann V, Illing T, et al. Contact Dermatitis in the Elderly: Predisposing Factors, Diagnosis, and Management. Drugs Aging. 2019;36(5):411-7. doi: 10.1007/s40266-019-00641-4.
5. Turkish Statistical Institute (TURKSTAT). Elderly population statistics, 2020. 2021. Available from https://data.tuik.gov.tr/Bulten/Index? p=Istatistiklerle-Yaslilar-2020-37227. Accessed May 25,2023.
6. Yalçin B, Tamer E, Toy GG, et al. The prevalence of skin diseases in the elderly: analysis of 4099 geriatric patients. Int J Dermatol. 2006;45(6):672-6. doi: 10.1111/j.1365-4632.2005.02607.x.
7. Bilgili SG, Karadag AS, Ozkol HU, et al. The prevalence of skin diseases among the geriatric patients in Eastern Turkey. J Pak Med Assoc. 2012;62(6):535-9.
8. Yaldiz M. Dermatological diseases in the geriatric age group: Retrospective analysis of 7092 patients. Geriatr Gerontol Int. 2019;19(7):582-5. doi: 10.1111/ggi.13665.
9. Yew YW, Kuan AHY, George PP, et al. Prevalence and burden of skin diseases among the elderly in Singapore: a 15-year clinical cohort study. J Eur Acad Dermatol Venereol. 2022;36(9):1648-59. doi: 10.1111/jdv.18205.
10. Aksoy Sarac G, Emeksiz MAC, Acar O, et al. Retrospective Analysis of Dermatological Diseases in Geriatric Patients During Dermatology Outpatient Department Visits. Dermatol Pract Concept. 2022;12(3):e2022145. doi: 10.5826/dpc.1203a145.
11. Varade RS, Burkemper NM. Cutaneous fungal infections in the elderly. Clin Geriatr Med. 2013;29(2):461-78. doi: 10.1016/j.cger.2013.01.001.
12. Özden MG, Ertürk K, Kartal SP, et al. An extraordinary outbreak of scabies in Turkey. J Eur Acad Dermatol Venereol. 2020;34(12):e818-e820. doi: 10.1111/jdv.16699.
13. Farage MA, Miller KW, Berardesca E, et al. Clinical implications of aging skin: cutaneous disorders in the elderly. Am J Clin Dermatol. 2009;10(2):73-86. doi: 10.2165/00128071-200910020-00001.
14. Phillips TJ. Chronic cutaneous ulcers: etiology and epidemiology. J Invest Dermatol. 1994;102(6):38S-41S. doi: 10.1111/1523-1747.ep12388556.
15. Norman RA. Geriatric dermatology. Dermatol Ther. 2003;16(3):260-8. doi: 10.1046/j.1529-8019.2003.01636.x.
16. Mathew A, Joks RO, Dapul-Hidalgo G. Seasonal Variation in Angioedema and Urticaria in an Inner-City Minority Population. J Allergy Clin Immunol. 2013;131(2):AB27. doi: 10.1016/j.jaci.2012.12.776.
17. Straesser M, Palacios T, Kyin T, et al. Seasonal correlations in chronic urticaria and allergic rhinitis. Ann Allergy Asthma Immunol. 2017;119(5):S39. doi: 10.1016/j.anai.2017.08.142.

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/ 10.31067/acusaglik.1394223

The Effect of Hashimoto's Thyroiditis on the Development of Thyroid Carcinoma

Sezin DOGAN ÇAKIR[1], Özlem ÇELİK[2], Özer AÇBAY[3]

[1]University of Health Sciences, Prof. Dr. Cemil Tascioglu City Hospital, Endocrinology and Metabolism Department, Istanbul, Turkey

[2]Division of Endocrinology and Metabolism, Department of Internal Medicine, Acibadem University School of Medicine, Istanbul, Turkey

[3]Istanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine, Department of Endocrinology and Metabolism, Istanbul, Turkey

Sezin DOGAN ÇAKIR
0000-0001-6641-7827
Özlem ÇELİK
0000-0003-4892-0626
Özer AÇBAY
0000-0002-7254-0757

Correspondence: Sezin Dogan Çakir University of Health Sciences, Prof. Dr. Cemil Tascioglu City Hospital, Departmant of Endocrinology and Metabolism, Darülaceze Cad. No:25 Şişli, İstanbul, Turkey.
Phone: +90 532 608 66 42
E-mail: sezin.dogan@gmail.com

Received: 21.11.2023
Accepted: 30.04.2024

ABSTRACT

Purpose: We aimed to investigate whether Hashimoto's Thyroiditis (HT) affects the development of thyroid carcinoma or not.

Methods: We examined 772 patients' files between January 2000 and December 2010 retrospectively at Istanbul University Cerrahpasa Medical School Endocrinology and Metabolism Clinic, where fine-needle aspiration biopsy (FNAB) was applied. We noted the patient's demographic findings, anti-thyroglobulin antibody (anti-TG) and anti-thyroperoxidase antibody (anti-TPO) levels, ultrasonography (US), and cytology reports. We compared the findings of HT patients without Hashimoto's as a control group.

Results: 393 patients with a mean age of 46.11 ± 12.53 of whom 39 were male and 354 were female with HT and thyroid nodules (HT group) were compared with 379 patients with a mean age of 47.5 ± 12.6 of whom 53 were male and 326 female with nonautoimmune thyroid disease and nodules (control group). We found the prevalence of differentiated thyroid carcinoma 6.6% in the HT group and backward 12.9% in the control group (p=0.03). There were not any distinguishing US findings between groups. Anti-TPO positivity was significantly higher in benign nodules (p=0.008).

Conclusion: Our findings did not point out an increased risk of Hashimoto's nodules in terms of differentiated thyroid carcinoma development.

Keywords: Hashimoto's Thyroiditis, Thyroid Carcinoma, Thyroid nodules, Fine-needle aspiration biopsy

ÖZET

Amaç: Amacımız Hashimoto tiroiditinin (HT), tiroid karsinomu gelişimi üzerine etkisini incelemektir.

Yöntem: İstanbul Üniversitesi Cerrahpaşa Tıp Fakültesi Endokrinoloji ve Metabolizma kliniğinde Ocak 2000- Aralık 2010 tarihleri arasında ince iğne aspirasyon biyopsisi (İİAB) uygulanan 772 hastanın dosyası geriye dönük olarak incelendi. Hastaların demografik bulguları, anti-tiroglobulin antikoru (anti-TG) ve anti-tiroperoksidaz antikoru (anti-TPO) düzeyleri, ultrasonografi (US) ve sitoloji raporları kaydedildi. Hashimoto Tiroiditi (HT) hastalarının bulguları hashimoto olmayan kontrol grubu ile kıyaslandı.

Bulgular: Ortalama yaşı 46.11 ± 12.53 olan, 39 erkek 354 kadın toplam 393 HT hastası (HT grubu), ortalama yaşı 47.5 ± 12.6 olan, 53 erkek ve 326 kadın toplam 379 hasta (kontrol grubu) ile karşılaştırıldı. Diferansiye tiroid karsinomu prevelansı HT grubunda %6.6, kontrol grubunda ise %12.9 saptandı (p=0.03). Gruplar arasında ayırt edici US bulgusu saptanmadı. Anti-TPO pozitifliği benign nodüllerde anlamlı olarak daha yüksekti (p=0.03).

Sonuç: Hashimoto tiroiditi nodüllerinde diferansiye tiroid karsinomu gelişimi yönünden artmış bir risk tespit edilmedi.

Anahtar kelimeler: Hashimoto tiroiditi, Tiroid karsinomu, Tiroid nodülü, İnce iğne aspirasyon biyopsisi

Hashimoto thyroiditis (HT) was first described more than a hundred years ago, now known as one of the most common autoimmune diseases that affects women predominantly (1). It is clear that HT is a risk factor for thyroid lymphoma development but its relationship with differentiated thyroid carcinoma has been debated since the cases Dailey documented in 1955 (2). Thyroid nodules are common in clinical practice and detected differentiated thyroid cancer is increasing worldwide (3). So, the clinician needs to detect suspicious conditions without overdiagnosing.

It is a debated topic if a nodule in HT patients differs from a nodule in a patient without thyroid autoimmunity in terms of malignancy development risk. In the literature, HT was found significantly associated with differentiated thyroid carcinoma in many retrospective studies (4, 5, 6, 7). But strikingly we can notice that studies that support the relationship are postsurgical series without a control group. Since surgery is performed on suspicious nodules, analyses of surgical series may easily lead to selection bias. Also, the immune response elicited towards tumor antigens can not be distinguished.

In the literature, FNAB-based studies are more limited and do not show a significant correlation between HT and DTC (8,9,10).

So, in our study, we compared the malignancy rate of HT nodules with non-hashimoto nodules in the control group with cytological criteria obtained by FNAB. The study aimed to determine the impact of HT on the development of differentiated thyroid carcinoma (DTC).

Material and Methods

The medical records of the patients with thyroid gland disorders who were followed up in the Cerrahpasa Medical School, Endocrinology and Metabolism clinic between January 2000 and December 2010 were retrospectively reviewed. The patients with one or more thyroid nodules, whose thyroid autoantibody level was checked, and who underwent nodule fine needle aspiration biopsy (FNAB) were evaluated.

The ethical approval was obtained from the Ethical Board Instution of Cerrahpasa Medical Faculty in Istanbul, Turkey (approval ID:16386). Patients with signs of hyperthyroidism, history of antithyroid drug use, radioactive iodine treatment or radiation exposure, FNAB cytology reporting medullary carcinoma, FNAB cytology results suspected or nondiagnostic but not confirmed, diagnosed with Graves disease or a different form of autoimmune thyroiditis were excluded from the study.

Hashimoto thyroiditis was defined as the patients who met one or more of the following criteria and at least one thyroid autoantibody positivity;

1- The patients with diffuse gland enlargement

2- The patients with heterogeneous parenchyma and echogenic septations were identified on ultrasound (US).

3- The patients with clinically euthyroid, subclinical hypothyroidism, or hypothyroidism with or without thyroid hormone replacement therapy.

4- The patients who have serum anti-thyroglobulin antibody (antiTG) with 0-40 u/ml reference range and/or anti-thyroperoxidase antibody (anti-TPO) with 0-35 u/ml reference range levels were obtained.

772 patients with FNAB cytology reported as lymphocytic thyroiditis, non-atypical thyrocyte, papillary carcinoma, and follicular carcinoma were evaluated. Three hundred ninety-three patients constituted the Hashimoto group while the patients with negative autoantibody levels and without defined clinical or US findings constituted the control group (n=379).

Demographic characteristics and US features of the patients were recorded. The number of the nodules (single, two, three, or more), size (1 cm and below, between 1-2 cm, 2 cm and above), echogenicity (hyperechoic, hypoechoic, isoechoic, mixed echo), nature (solid, predominant, cystic predominant), calcification form (eggshell, coarse, microcalcification), presence of peripheral halo were all noted. Cytology results were evaluated as benign and malignant. Gender, age, ultrasonography findings, and cytology results of HT patients were compared with the control group.

The patients in the Hashimoto group who were found to be benign and patients who were found to be malignant as a result of FNAB were compared in terms of demographic characteristics, ultrasonographic findings, and autoantibody positivity. Besides, the characteristics of the patients with benign and malignant nodules in the whole cohort were studied.

Statistical analyses were performed using SPSS software version 17. Descriptive analyses presented means and standard deviations for normally distributed variables.

The Chi-square test and Fisher's exact test were used to compare proportions and the Student's t-test was used to compare the parameters between groups. A P value of less than 0.05 was considered to show statistical significance.

Results

The mean age of 772 patients included in the study was 46.79 ± 12.57 (18-86) years. 88.1% (n= 680) of the patients were female and 11.9% (n= 92) were male. FNAB of the nodules resulted as 90.3% (n= 697) benign and 9.7% (n= 75) malignant.

Table 1 presents the demographic and US characteristics of the HT and control groups. The mean gender and age of the groups were found to be compatible with each other.

US findings

When US findings were compared, in both groups' multiple nodules of 1-2 cm in size, with similar echogenicity with excess cystic components mostly detected. The presence of a peripheral halo in Hashimoto's nodules was found significant (p=0.001). No significant difference was observed between the groups in terms of calcification content, but eggshell calcification was more common in the Hashimoto group and microcalcification was more common in the control group. The presence of 1-2 cm in size, single or two nodules in the Hashimoto group; three or more nodules smaller than 1 cm and above 2 cm in the control group was found to be statistically higher (p=0.002).

Table 1. The demographic and ultrasonographic characteristics of the patient and control groups

	Hashimoto's Thyroiditis	Control group	p-value
Number (%)	393 (50.9)	379 (49.1)	
Sex F/M	354 (90.1) / 39 (9.9)	326 (86) / 53 (14)	0.082
Age ± mean	46.11 ± 12.53	47.5 ± 12.6	0.127
Number of nodules			
One	70 (20.9)	48 (15)	
Two	49 (14.6)	27 (8.4)	**0.002**
Three or more	216 (64.5)	246 (76.6)	
Nodule size, cm			
<1 cm	5 (1.4)	6 (1.9)	
1-2 cm	322 (90.2)	250 (80.9)	**0.002**
>2 cm	30 (8.4)	53 (17.2)	
Echogenicity			
Hypoechoic	47 (27.6)	34 (29.6)	
İsoechoic	46 (27.1)	33 (28.7)	0.572
Hyperechoic	38 (22.4)	18 (15.7)	
Mixed echo	39 (22.9)	30 (26.1)	
Calcification form			
Eggshell	3 (10)	1 (2.6)	
Coarse	11 (36.7)	14 (36.8)	0.428
Microcalcifications	16 (53.3)	23 (60.5)	
Peripheral halo			
presence	77 (19.6)	41 (10.8)	**0.001**
absence	316 (80.4)	338 (89.2)	
Composition			
Solid predominant	11 (18.6)	10 (13.9)	0.46
Cystic predominant	48 (81.4)	62 (86.1)	

FNAB results

The comparison of the cytology results of the Hashimoto group with the control group is given in Table 2. When we analyzed the results of FNAB, we found that 6.6% of the patients in the Hashimoto group and 12.9% of those in the control group resulted as malignant. The malignancy rate was significantly higher in the control group, and nearly twice as high in the Hashimoto group (p=0.03).

Table2. Fine needle aspiration biopsy results of Hashimoto and control groups

Number (%)	Hashimoto's Thyroiditis	Control group	p-value
Benign	367 (93.4)	330 (87.1)	**0.003**
Malignant	26 (6.6)	49 (12.9)	

Comparison of benign-malignant nodules

Table 3 presents the demographic characteristics and US findings of the nodules. When we compare the cases according to cytology results; there was no difference between the mean age and gender distribution of benign and malignant nodules. While both measured autoantibodies were found to be positive at a higher rate in the benign group; AntiTPO positivity of benign nodules was also statistically significant (p=0.008). 1 cm or less and 2 cm and above in size, the presence of hypoechogenicity and microcalcification in the malign nodules; the presence of peripheral halo around benign nodules was found to be statistically significant.

Table3. Demographic and ultrasonographic characteristics due to cytology results

	Benign	Malignant	p-value
Number (%)	697 (90.3)	75 (9.7)	
Sex F/M	611 (87.7) / 86 (12.3)	69 (92) / 6 (8)	0.270
Age ± mean	46.9 ± 12.46	45.8 ± 13.6	0.490
Anti-TPO positivity	322 (46.3)	22 (30.1)	**0.008**
Anti - TG positivity	187 (29.1)	16 (23.9)	0.366
Number of nodules			
One	111 (18.0)	7 (17.9)	
Two	73 (11.8)	3 (7.7)	0.634
Three and more	433 (70.2)	29 (74.4)	
Nodule size, cm			
<1 cm	7 (1.1)	4 (10.3)	
1-2 cm	544 (86.8)	28 (71.8)	**0.001**
>2 cm	76 (12.1)	7 (7.9)	
Echogenicity			
Hypoechoic	68 (26.1)	13 (54.2)	
Isoechoic	76 (29.1)	3 (12.5)	**0.028**
Hyperechoic	53 (20.3)	3 (12.5)	
Mixed acho	64 (24.5)	5 (20.8)	
Calcification			
Eggshell	4 (6.7)	0 (0.0)	
coares	25 (41.7)	0 (0.0)	**0.034**
Microcalcifications	31 (51.7)	8 (100)	
Peripheral halo			
presence	116 (16.6)	2 (2.7)	**0.001**
absence	581 (83.4)	73 (97.3)	
Composition			
Solid predominant	19 (15.2)	2 (33.3)	0.237
Cysticpredominant ağırlıklı	106 (84.8)	4 (66.7)	

The characteristics of Hashimoto's nodules

Table 4 shows the demographic characteristics, US findings, and distribution of autoantibody positivity within the HT group according to cytology results. When we compared the patients of the Hashimoto group, whose FNAB results were found to be benign, and those whose results were found to be malignant; we found that they generally reflect the characteristics of benign and malignant nodules of the whole population. It was found statistically significant that benign HT nodules were between 1-2 cm in size and contained a peripheral halo. Of the 30 Hashimoto patients whose calcification features could be evaluated, 4 of whom cytology was found to be malignant also contained microcalcifications, whereas all kinds of calcifications could be seen in benign nodules. Malignant HT nodules were found to be more hypoechoic than other malignant nodules. Besides, ≤1 cm and≥2 cm in size, microcalcification, and containing predominantly solid components were found to be significant. Although there was no statistically significant difference between the groups in terms of autoantibody positivity, more antiTG positivity was found in malignant HT nodules.

Table 4. Demographic, ultrasonographic, and autoantibody findings of Hashimoto Group due to cytology results

	Benign HT	Malignant HT	p-value
Number (%)	367 (93.4)	26 (6.6)	
Sex F/M	331 (90.2) / 36 (9.8)	23 (88.5) / 3 (11.5)	0.776
Age ± mean	46.2 ± 12.49	44.6 ± 13.05	0.528
Anti - TPO	322 (88.0)	22 (84.6)	0.613
Anti - TG	187 (58.8)	16 (69.6)	0.310
Number of nodules			
One	66 (20.9)	4 (21.1)	
Two	46 (14.6)	3 (15.8)	0.988
Three and more	204 (64.6)	12 (63.2)	
Nodule size, cm			
<1 cm	3 (0.9)	2 (10.0)	
1-2 cm	309 (91.7)	13 (65.0)	**0.001**
>2 cm	25 (7.4)	5 (25.0)	
Echogenicity			
Hypoechoic	40 (25.6)	7 (50.0)	
Isoechoic	44 (28.2)	2 (14.3)	0.243
Hyperechoic	35 (22.4)	3 (21.4)	
Mixed echo	37 (23.7)	2 (14.3)	
Peripheral halo			
presence	76 (20.7)	1 (3.8)	**0.036**
absence	291 (79.3)	25 (96.2)	
Composition			
Solid predominant	9 (16.1)	2 (66.7)	**0.028**
Cystic predominant	47 (83.9)	1 (33.3)	

Discussion

In our study, while the rate of DTC was 6.6% in the HT group, it was found to be significantly higher at 12.9% in the control group. To our knowledge, our study was the first study in which DTC was found to be twice as low in HT patients compared to a matched control group. Also, our study showed that the risk of DTC development was not increased in nodules on HT. A similar result was also shown in the study conducted by Yue Jie et al. (11). Even the patients with DTC in the aforementioned study were diagnosed with HT via pathological examination. It should be kept in mind that the most important issue here is whether the inflammation in the pathological specimen is a peritumoral inflammatory reaction or a finding of Hashimoto's thyroiditis.

Although some studies report that malignant HT nodules are detected more frequently in females or younger patients; in this study, similar to many other studies in the literature, we did not find the difference between groups in terms of age or gender (4, 6, 9, 12).

In a multicenter study in which sonographic analysis of HT was performed, very similar to our study, the mean age was 49 and 89% were female, and their nodules were reported to be between 1-2 cm in size, but the presence of peripheral halo was not found to be significant for HT in the study (13). In the study of Anil C et al., the presence of multiple nodules with similar echogenicity in their study population and the presence of peripheral halo in the HT group support the findings of our study (8). In the study of Ohmori N et al., while nodule echogenicity was similar in both groups, it was reported that more coarse calcifications were observed in patients with malignant HT (14). Gul K et al. found that hypoechogenicity, microcalcification, and solitary nodules were more common in the HT group; whereas they reported that microcalcification and halo loss were higher in control patients (4). The common point of all these studies is that the stated US findings did not represent a statistically significant difference between the groups and it should be underlined that there was no typical and distinctive US finding for HT nodules.

The features of malignant nodules in our study, such as being significantly hypoechoic, containing microcalcification, and size are consistent with the US features of suspected malignant nodules defined in the thyroid nodules approach guidelines. Besides, the fact that malignant nodules are predominantly solid components and benign nodules contain peripheral halo is an expected finding (3). It is consistent with the literature that HT nodules reflect the characteristics of malignant or benign nodules in the general population, and that they do not show any additional distinguishing features (12).

HT-DTC coexistence was found in 17.7% of 35 cases documented by Dailey et al. for the first time (2). The link between HT and DTC has long been a topic of controversy. There are conflicting reports; some suggest that these two are positively correlated, whereas other studies report no relationship. The mean prevalence rate can change from 1.2% in FNAB studies to 36.6% in thyroidectomy studies (15).

The reason for the wide distribution of HT-DTC association rates found in the literature may be due to the design of the studies, and the ethnic or geographical characteristics of the selected patients (16). Most of the retrospective-designed surgical case series without a control group reflect high rates of HT-DTC association (4, 5, 6). Thyroidectomy indications of these patients may differ. Surgery is generally performed when thyroid nodules are suspicious of malignancy. More importantly, the presence of reactive lymphocytic thyroiditis around the tumor and primary lymphocytic thyroiditis could not be distinguished from each other in the histopathological examination. The detected thyroiditis may be only a peritumoral inflammatory response (7, 15, 17, 18, 19).

A higher rate of positive detection of antibodies against both TPO and TG in patients with benign cytology results was a predictable result since the HT group also consisted of patients with benign cytology at a high rate. Generally, statistical significance was shown between anti-TPO positivity and benign cytology in our patients. The fact that anti-TPO is a more specific antibody for autoimmune thyroiditis than anti-TG may explain our finding of anti-TPO positivity and HT together at a higher rate in the benign group. Only 4 to 6 of the approximately 40 epitopes of thyroglobulin can be recognized by B cells and besides, TG which was synthesized due to the immune response in the presence of thyroid carcinoma contains epitopes different from those produced in the background of autoimmune thyroiditis may explain the coexistence of antiTG positivity and thyroid carcinoma. At the same time, this supports us in detecting more antiTG positivity in malignant HT nodules (9, 20, 21). AntiTG positivity may be more significant than anti-TPO positivity for a suspected malignant HT nodule. According to the 1638 patient comprehensive FNAB study published by Kim E.S et al., HT-DTC association was not found significant; while no difference was reported between malignant and benign nodules in terms of the number of nodules, gender of the patients, and anti-TPO positivity, on the contrary it was shown that malignant nodules were smaller and more anti-TG positive (9).

In a postsurgery study of 140 thyroidectomized patients, the prevalence of DTC and HT coexistence was 8.6% and Mazakopakis et all did not find a statistically significant difference between DTC and HT (22).

The results of Casagna et al's did not found a relationship between autoimmune thyroiditis with nodules and thyroid cancer. They also indicate that surgical series that found a correlation between cancer and autoimmune thyroiditis consists of patients who underwent surgery due to more suspicious nodules and this condition leads to selection bias (23).

We can see that there is not enough evidence to claim that HT is a risk factor for DTC, and more tissue studies are needed to carefully distinguish peritumoral lymphocytic reaction from primary lymphocytic thyroiditis. The significantly higher rates of HT-DTC coexistence in surgical series and much lower rates in the few FNAB studies also support this idea. In our opinion thyroiditis, which is detected mostly, is an immune response to the tumor and occurs in response to tissue damage caused by the tumor, so it should be evaluated as a secondary lymphocytic reaction rather than a predisposing lesion. Therefore, there is a bias depending on whether the study performs due to FNAB or post-surgery results (15). The immune response is likely elicited towards tumor antigens in cancer patients which are shared with normal thyroid tissues thereby inducing specific thyroid autoimmunity.

The main limitation of our study is that the diagnosis of Hashimoto was not confirmed pathologically in the surgical specimen. However, we believe that our results may not have been affected by the increased false positivity of the diagnosis of HT in surgical specimens secondary to the peritumoral lymphocyte infiltration.

Conclusion

In our study, the fact that the diagnosis of HT was not based on histopathological examination but it was based on clinical findings and autoantibody positivity, and also the presence of the sex-age matched control group prevented false positive results. Thus, the frequency of DTC in patients with HT was found to be 1.95 times lower than in patients without HT. HT nodules did not show any additional features that would require us to change our approach to suspected malignant nodules. Prospective-designed studies with longer follow-up periods are needed to further elucidate this relationship.

Declarations

Funding

None

Conflicts of interest/Competing interests

It was derived from " İstanbul Üniversitesi Cerrahpaşa Tıp Fakültesi İç hastalıkları Anabilim Dalı İç hastalıkları

Uzmanlık tezi Hashimoto Tiroiditinin Tiroid Karsinomu Gelişmesi Üzerine Etkisi-2011" and was presented as a poster in 15th International and 14th European Congress of Endocrinology.

Ethics approval

Institutional Ethical Board of Cerrahpasa Medical Faculty in Istanbul, Turkey (approval ID:16386; 09/05/2011)

Availability of data and material

The data that support the findings of this study are available from the corresponding author, [SDÇ], upon reasonable request.

Authors' contributions

The authors confirm their contribution to the paper as follows: study conception and design: ÖA, ÖÇ; data collection: SDÇ; analysis and interpretation of results: SDÇ, ÖÇ; draft manuscript preparation: SDÇ. All authors reviewed the results and approved the final version of the manuscript.

References

1. Caturegli P, De Remigis A, Rose NR. Hashimoto Thyroidits: clinical and diagnostic criteria. Autoimmun Rev. 2014;13(4-5):391-397.
2. Dailey ME, Lindsay S, Shaken R. Relation of thyroid neoplasms to Hashimoto disease of the thyroid gland. AMA Arch Surg 1955;70: 291-297.
3. Haugen BR, Alexander EK, Bible KC, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Dİffetentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. Thyroid. 2016; 26(1):1-133.
4. Gul K, Dirikoc A, Kiyak G, et al. The association between thyroid carcinoma and Hashimoto's thyroiditis is the ultrasonographic and histopathologic characteristics of malignant nodules. Thyroid. 2020;20(8):873-878.
5. Shih ML, Lee JA, Hsieh CB, et al. Thyroidectomy for hashimoto's thyroiditis complications and associated cancers. Thyroid. 2008; 18(7):729-734.
6. Repplinger D, Bargren A, Zhang YW, et al. Is Hashimoto thyroiditis a risk factor for papillary thyroid cancer? J Surg Res. 2008; 150(1):49-52.
7. Mao L, Zheng C, Ou S, et al. Influence of Hashimoto thyroiditis on diagnosis and treatment of thyroid nodules. Front Endocrinol (Lausanne). 2022; 23(12):1067390.
8. Anil C, Goksel S, Gursoy A. Hashimoto's thyroiditis is not associated with increased risk of thyroid cancer in patients with thyroid nodules a single center prospective study. Thyroid. 2020; 20(6):601-606.
9. Kim E S, Lim D J, Baek K H, et al. Thyroglobulin antibody is associated with increased cancer risk in thyroid nodules. Thyroid. 2020; 20(8):885-891.
10. Erdogan M, Erdem N, Cetinkalp S, et al. Demographic, clinical, laboratory, ultrasonographic, and cytological features of patients with Hashimoto's thyroiditis results of a university hospital of 769 patients in Turkey. Endocrine. 2009; 36(3):486-490.
11. Jie Y, Ruan J, Luo M, et al. Ultrasonographic, clinical, and pathological features of papillary thyroid carcinoma in children and adolescents with or without Hashimoto's thyroiditis. Front Oncol. 2023 Aug 1:13:1198468.
12. Anderson L, Middleton WD, Teefey SA, et al. Hashimoto thyroiditis part 2: sonographic analysis of benign and malignant nodules in patients with diffuse Hashimoto thyroiditis. AJR Am J Roentgenol. 2010; 195(1):216-222.
13. Anderson L, Middleton WD, Teefey SA, et al. Hashimoto thyroiditis part 1: sonographic analysis of nodular form of Hashimoto thyroiditis. AJR Am J Roentgenol. 2010; 195(1):208-215.
14. Ohmori N, Miyakawa M, Ohmori K, et al. Ultrasonographic findings of papillary thyroid carcinoma with Hashimoto's thyroiditis. Intern Med. 2007; 46(9):547-550.
15. Jankovic B, Le KT, Hershman JM. Clinical Review: Hashimoto's thyroiditis and papillary thyroid carcinoma: is there a correlation? J Clin Endocrinol Metab. 2013; 98(2):474-482.
16. Sweis NWG, Zayed AA, Jaberi MA, et al. Geographic variation in the association between Hashimotot's thyroiditis and Papillary thyroid carcinoma, a meta-analysis. Endocrine. 2023; 2.doi:10.1007/s12020-023-03378-8.
17. Ahn D, Heo SJ, Park JH, et al. Clinical relationship between Hashimoto's thyroiditis and papillary thyroid cancer. Acta Oncol. 2011; 50(8):1228-1234.
18. Kebebew E, Treseler P A, Ituarte P H G, et al. Coexisting chronic lymphocytic thyroiditis and papillary thyroid cancer revisited. World J Surg. 2001; 25:632-637.
19. Crile G Jr. Struma lymphomatosa and carcinoma of the thyroid. Surg Gynecol Obstet. 1978; 147(3):350-352.
20. Latrofa F, Ricci D, Grasso L, et al. Characterization of thyroglobulin epitopes in patients with autoimmune and non-autoimmune thyroid diseases using recombinant human monoclonal thyroglobulin antibodies. J Clin Endocrinol Metab. 2008; 93(2):591-596.
21. Sinclair D. Clinical and laboratory aspects of thyroid autoantibodies. Ann Clin Biochem. 2006; 43(3):173-183.
22. Mazakopakis E, Tzortzinis A, Dalieraki-Ott E, et al. Coexistence of Hashimoto's thyroiditis with papillary thyroid carcinoma. A retrospective study. Hormones (Athens). 2019; 9(4):312-318.
23. Castagna MG, Belardini V, Memmo S, et al. Nodules in autoimmune thyroiditis are associated with increased risk of thyroid cancer in surgical series but not in cytological series: Evidence for selection bias. J Clin Endocrinol Metab. 2014; 99(9):3193-3198.

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/ 10.31067/acusaglik.1267445

Evaluation of the Perceptions and Attitudes Towards Dating Violence Among Medical Students

Zeynep Meva ALTAŞ[1], Seyhan HIDIROĞLU[2], Selin DOĞAN JAMIL[3], Maram ALSHARAKHI[4], Malak ALSULTAN[4], Maha ABDULLAH ALHARBİ[4], Fadilah SALIU-AHMED[4]

[1]Umraniye District Health Directorate, Public Health, Istanbul, Turkey
[2]Marmara University School of Medicine, Public Health, Istanbul, Turkey
[3]Marmara University School of Medicine, Public Health, Istanbul, Turkey
[4]Marmara University School of Medicine, Istanbul, Turkey

Zeynep Meva ALTAŞ
0000-0003-0475-8946
Seyhan HIDIROĞLU
0000-0001-8656-4613
Selin DOĞAN JAMIL
0000-0001-9449-4539
Maram ALSHARAKHI
0000-0001-7981-3220
Malak ALSULTAN
0000-0002-6045-7745
Maha ABDULLAH ALHARBİ
0000-0002-0516-2653
Fadilah SALIU-AHMED
0000-0002-4884-7855

Correspondence: Zeynep Meva Altaş
Umraniye District Health Directorate, Atatürk, Okan St. No:4, 34764
Ümraniye / İstanbul, Turkey.
Phone: +90 216 443 39 11
E-mail: zeynep.meva@hotmail.com

Received: 19.03.2023
Accepted: 24.01.2024

ABSTRACT

Purpose: The aim of this study was to evaluate the perceptions and attitudes of medical students about dating violence.

Methods: In the cross-sectional study, the universe was medical students of 1st-6th grade in a state university in Istanbul. A questionnaire consisting of sociodemographic questions (18 questions), Dating Violence Attitude Scale (DVAS), Dating Violence Perception Scale (DVPS) was sent to the participants by mobilephone via WhatApp.

Results: The median age of 339 students who answered the questionnaire was 21.0 (17.0-29.0). Of the students 61.4% (n=208) were women. The rates of students who used nicotine and alcohol were 53.4% (n=181) and 58.4% (n=198), respectively. Of the students 67.3% (n=228) had a dating relationship before, and 30.4% (n=103) had current relationship. Of the students had a dating relationship before, 23.7% (n=54) had experienced dating violence in their past relationship, and 14.6% (n=15) of the students who had a current dating relationship had experienced dating violence in their current relationship. Students who used nicotine and alcohol were exposed to a higher rate of dating violence. While the total scores of DVAS of women were higher than men, the total scores of DVPS were significantly lower ($p<0.001$ for both). Alcohol users had lower DVPS total scores than non-drinkers ($p=0.004$).

Conclusion: The rate of exposure to dating violence is high in medical students. Interventions are needed especially for groups at risk for exposure to dating violence. Qualitative and quantitative studies should be conducted to investigate the reasons why young people tend to violence.

Keywords: Dating Violence, Medical Students, Perception of Dating Violence, Dating Violence Attitude, Relationship

ÖZET

Amaç: Bu çalışmanın amacı, tıp fakültesi öğrencilerinin flört şiddetine ilişkin algı ve tutumlarını değerlendirmektir.

Yöntem: Kesitsel tipteki araştırmanın evrenini, İstanbul'da bir devlet üniversitesinde öğrenim gören 1-6. sınıf tıp öğrencileri oluşturmaktadır. Katılımcılara sosyodemografik sorular (18 soru), Flört Şiddeti Tutum Ölçeği (FŞTÖ), Flört Şiddeti Algısı Ölçeği'nden (FŞAÖ) oluşan bir anket cep telefonu aracılığıyla WhatApp aracılığıyla gönderildi.

Bulgular: Anketi yanıtlayan 339 öğrencinin ortanca yaşı 21.0 (17.0-29.0) idi. Öğrencilerin %61,4'ü (n=208) kadındı. Sigara ve alkol kullanan öğrencilerin oranları sırasıyla %53,4 (n=181) ve %58,4 (n=198) idi. Öğrencilerin %67,3'ünün (n=228) daha önce flört ilişkisi, %30,4'ünün (n=103) ise şu an ilişkisi bulunmaktadır. Daha önce flört ilişkisi olan öğrencilerin %23,7'si (n=54) önceki ilişkilerinde; halen flört ilişkisi olan öğrencilerin ise %14,6'sı (n=15) mevcut ilişkilerinde flört şiddeti yaşamıştı. Sigara ve alkol kullanan öğrenciler daha yüksek oranda flört şiddetine maruz kalmışlardı. Kadınların FŞTÖ toplam puanları erkeklerden yüksek iken, FŞTÖ toplam puanları anlamlı olarak düşüktü (her ikisi için de $p<0.001$). Alkol kullananların FŞAÖ toplam puanları, içmeyenlere göre daha düşüktü ($p=0,004$).

Sonuç: Tıp fakültesi öğrencilerinde flört şiddetine maruz kalma oranı yüksektir. Özellikle flört şiddetine maruz kalma riski taşıyan gruplar için müdahalelere ihtiyaç vardır. Gençlerin şiddete yönelme nedenlerinin araştırılması için nitel ve nicel araştırmalar yürütülmelidir.

Anahtar Kelimeler: Flört Şiddeti, Tıp Öğrencileri, Flört Şiddeti Algısı, Flört Şiddeti Tutumu, İlişki

Intimate partner violence is a serious problem that can have a profound impact on lifelong health, opportunity, and well-being (1). According to the World Health Organization (WHO), dating violence is defined as 'intimate relationships among young people, which may be of varying duration and intensity,and do not involve cohabiting' (2). Unfortunately, the frequency of dating violence is increasing, and for this reason, it is an important public health problem that needs to be addressed worldwide (3-7).

Today, the issue of dating violence is frequently discussed and there are many studies conducted on this subject in the literature. Although dating violence can be seen in both genders, women are more frequently exposed to dating violence and negative health outcomes related to dating violence are more common in women (7-9). In addition, dating violence is more common at younger ages. According to the Centers for Disease Control and Prevention (CDC), 1 out of every 12 high school students in the USA has been exposed to physical and sexual dating violence (10). In a study conducted in our country, 88% of female university students had been subjected to emotional violence, 22.2% of them had been subjected to verbal abuse, 21.4% of them had been economically abused, 16.4% of them had been subjected to physical violence, and 7.2% of them had been subjected to sexual violence by their partners (5).

The ages between 18-30 years corresponding to the university period; is when young people step into adulthood. Since university students are in an emotionally fragile period, they may be more affected by the effects of dating violence (11). This period poses a risk for dating violence, and students experience violent behaviors more frequently during these times (12). In a study in the literature, the attitudes of university students towards dating violence were evaluated and it was reported that the acceptance attitudes of medical faculty students towards dating violence were lower than those of students from other faculties (13). In a study conducted with students in the 5th and 6th grades of medical school, approximately one in five of those who had were not exposed to dating violence previously and did not perpetrate violence to their partner. In the same study, students most frequently perpetrate emotional violence on their partners or were exposed to emotional violence (14).

It is necessary to know the frequency of dating violence, which may have negative consequences especially in young people who are exposed to it (2,15). In addition, the factors that predispose to dating violence should be determined in order to prevent dating violence. In this context, the aim of this study was to evaluate the experiences, perceptions and attitudes of medical school students about dating violence.

Material and Methods

Study Place and Design

The population was medical faculty students of 1st-6th grade in a state university in Istanbul. A questionnaire was used to evaluate the perceptions and attitudes of medical students about dating violence.

Research Type

The study is a cross-sectional study.

Population

There are total 1589 medical faculty students studying in 2022 and 2023 in the relavant university.The sample size was calculated as 310; as the percentage of high perception of dating violence among medical school students was accepted as 50%, margin of error 5%, and confidence level of 95%.

Questionnaire

A questionnaire consisting of sociodemographic questions (18 questions), Dating Violence Attitude Scale (DVAS), Dating Violence Perception Scale (DVPS) was used. Sociodemographic questions were inspired from other studies in literature (16-19) including data about gender, current class, current smoking status (yes or no), current alcohol use (yes or no) and questions about their dating relationship.

Dating Violence Attitude Scale (DVAS)

The Dating Violence Attitude Scale was developed in 2016 (16). It was developed to determine the attitudes of university students regarding violent behaviors in dating relationships. It includes 5 different assessment areas: physical, emotional, economic, sexual and general violence sub-dimensions. DVAS is a 5-point likert-type scale consisting of 28 questions, scored between 1-5 (1: Strongly disagree-5: Strongly agree). The fact that the average score obtained from the scale is close to 5 indicates that the attitudes of individuals towards dating violence do not support dating violence.

Dating Violence Perception Scale (DVPS)

It is a scale developed in 2022 to be applied especially to university students between the ages of 18-30, and it has the feature of evaluating how individuals perceive dating violence related to scenario-based sexual, physical and psychological dating violence (17). For each of the perceptions of physical, sexual and psychological dating violence, 15 questions are asked over three different scenarios. There are a total of 15 questions in the scale and it has a single factor. Scores from the scale range from 15 to 90. High scores mean that the person does not perceive the relevant dating violence (physical, sexual, or psychological) as abusive.

Data Collection

The questionnaire was sent to the participants by mobile-phone via WhatApp. Before the questionnaire, the participants were informed about the purpose of the study and their consent was obtained.

Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows 25.0 program was used for statistical analysis and data recording. Mean, standard deviation, median, minimum and maximum values and numbers (n) and percentages (%) were used for descriptive data. Pearson Chi-Square (or Fisher Exact test, where appropriate) test was used to compare categorical data. Conformity of continuous variables to normal distribution was examined by visual (histogram and probability graphs) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). It was analyzed with the Mann-Whitney U test for comparison of continuous variables that did not fit the normal distribution. The relationship between two continuous variables in which the normal distribution was not observed was evaluated with the Spearman correlation test. Statistical significance was determined as <0.05.

Results

In the study, 339 students answered the questionnaire. The median age of the students was 21.0 (17.0-29.0). Of the students 61.4% (n=208) were women. Percentage of students between the first and 6th grades were 22.7% (n=77), 10.0% (n=34), 13.6% (n=46), 17.4% (n=59), 18.6% (n=63) and 17.7% (n=60), respectively. Of the parents of students 87.6% (n=297) were together. The percentage of students who used nicotine and alcohol was 53.4% (n=181) and 58.4% (n=198), respectively.

Of the students 67.3% (n=228) had a dating relationship before, and 30.4% (n=103) current relationship. Of the students 23.7% (n=54) had a previous dating relationship, had experienced dating violence previously. Of the students having current dating relationship, 14.6% (n=15) experienced dating violence in their current relationship. Students experienced mostly psychological violence in their previous and current relationships (22.8% [n=52] and 13.6% [n=14], respectively) (Table 1).

Table 1. The data of the participants about dating relationship and dating violence

		n	%
Having a dating relationship before	Yes	228	67.3
	No	111	32.7
Having a current dating relationship	Yes	103	30.4
	No	236	69.6
Experience of dating violence previously	Yes	54	23.7
	No	174	76.3
Experience of psychological dating violence previously	Yes	52	22.8
	No	176	77.2
Experience of physical dating violence previously	Yes	6	2.7
	No	217	97.3
Experience of sexual dating violence previously	Yes	9	4.0
	No	214	96.0
Experience of economic dating violence previously	Yes	4	1.8
	No	219	98.2
Experience of dating violence in current relationship	Yes	15	14.6
	No	88	85.4
Experience of psychological dating violence in current relationship	Yes	14	13.6
	No	89	86.4
Experience of physical dating violence in current relationship	Yes	3	2.9
	No	100	97.1
Experience of sexual dating violence in current relationship	Yes	1	1.0
	No	102	99.0
Experience of economic dating violence in current relationship	Yes	1	1.0
	No	102	99.0

When the factors that may be related to exposure to dating violence were evaluated; 24.9% (n=45) of smokers and 8.9% (n=14) of non-smokers stated that they were exposed to dating violence in the past or in their current relationship (p<0.001). Students who used alcohol also stated that they were exposed to dating violence at a statistically significantly higher rate than non-drinkers (23.7% [n=47], 8.5% [n=12], respectively) (p<0.001). There was no significant relationship between gender, class, relationship status of parents and exposure to dating violence (p>0.05) (Table 2).

Table 2. Factors associated with exposure to dating violence in a past or current relationship

		Exposure to dating violence		P value
		Yes n (%)	No n (%)	
Gender	Male	22 (16.8)	109 (83.2)	0.814
	Female	37 (17.8)	171 (82.2)	
Class	1	6 (7.8)	71 (92.2)	0.072
	2	5 (14.7)	29 (85.3)	
	3	7 (15.2)	39 (84.8)	
	4	11 (18.6)	48 (81.4)	
	5	17 (27.0)	46 (73.0)	
	6	13 (21.7)	47 (78.3)	
Relationship status of parents	Together	48 (16.2)	249 (83.8)	0.109
	Seperated	11 (26.2)	31 (73.8)	
Smoking	Yes	45 (24.9)	136 (75.1)	**<0.001**
	No	14 (8.9)	144 (91.1)	
Using alcohol	Yes	47 (23.7)	151 (76.3)	**<0.001**
	No	12 (8.5)	129 (91.5)	

When the students' DVAS and DVPS scores were evaluated; the highest score was obtained from the sub-dimensions of general violence and physical violence in the DVAS scale. The lowest score was obtained from the sexual violence sub-dimension. The highest score was obtained from the physical violence sub-dimension, and the lowest score was obtained from the psychological violence sub-dimension according to the DVPS scores (Table 3).

Table 3. Scores of DVAS ve DVPS of participants

	Median	Minimum	Maximum
DVAS-General violence	5.0	1.2	5.0
DVAS- Physical violence	5.0	1.8	5.0
DVAS- Psychological violence	4.5	1.83	5.0
DVAS- Economic violence	4.4	1.00	5.0
DVAS- Sexual violence	0.97	0.34	1.0
DVAS total score	4.68	1.96	5.0
DVPS- Sexual violence	17.0	15.0	76.0
DVPS- Physical violence	20.0	15.0	90.0
DVPS- Psychological violence	16.0	15.0	90.0
DVPS total score	57.0	45.0	256.0

When the factors related to the participants' attitudes and perceptions of dating violence were evaluated, while the total scores of DVAS of women were significantly higher than those of men, the total scores of DVPS were significantly lower (p<0.001 for both). Experiencing dating violence in previous relationships did not have a significant effect on dating violence attitude and perception scores (p>0.05). Those who experienced dating violence in their current relationships had significantly higher DVAS and DVPS scores (p=0.002 and p<0.001). In other words, those who are not exposed to dating violence are less supportive of dating violence; and perception of dating violence as a problem was also higher in students without an experience of dating violence. Alcohol users had significantly lower DVPS total scores than non-drinkers (p=0.004). The class, relationship status of parents, previous dating relationship, smoking status did not have a significant effect on scale scores (p>0.05) (Table 4).

Table 4. Scores of DVAS and DVPS and related factors

Median (min-max)		Total DVAS	p value Median (min-max)	Total DVPS	p value
Gender	Male	4.6 (2.8-5.0)	**<0.001**	71.0 (45.0-171.0)	**<0.001**
	Female	4.7 (2.0-5.0)		52.0 (45.0-256.0)	
Class	1	4.7 (3.1-5.0)	0.234	58.0 (45.0-164.0)	0.756
	2	4.6 (3.5-5.0)		56.5 (45.0-158.0)	
	3	4.7 (2.0-5.0)		58.0 (45.0-256.0)	
	4	4.7 (3.0-5.0)		53.0 (45.0-160.0)	
	5	4.6 (3.2-5.0)		59.0 (45.0-171.0)	
	6	4.6 (3.5-5.0)		59.0 (45.0-143.0)	
Relationship status of parents	Together	4.7 (2.0-5.0)	0.554	57.0 (45.0-256.0)	0.465
	Seperated	4.7 (3.0-5.0)		58.0 (45.0-155.0)	
Having a dating relationship before	Yes	4.7 (2.0-5.0)	0.203	55.0 (45.0-256.0)	0.160
	No	4.6 (3.0-5.0)		60.0 (45.0-164.0)	
Experience of dating violence previously	Yes	4.6 (2.0-5.0)	0.429	56.0 (45.0-256.0)	0.731
	No	4.7 (3.5-5.0)		55.0 (45.0-171.0)	
Experience of dating violence in current relationship	Yes	4.5 (2.0-5.0)	**0.002**	95.0 (48.0-256.0)	**<0.001**
	No	4.7 (3.0-5.0)		56.0 (45.0-171.0)	
Smoking	Yes	4.7 (2.8-5.0)	0.862	55.0 (45.0-164.0)	0.576
	No	4.7 (2.0-5.0)		59.0 (45.0-256.0)	
Using alcohol	Yes	4.6 (2.8-5.0)	0.128	61.0 (45.0-164.0)	**0.004**
	No	4.7 (2.0-5.0)		55.0 (45.0-256.0)	

When the correlation of the scales was evaluated, a significant negative correlation was observed in the total score and all sub-dimension scores of the DVAS and DVPS scales (p<0.001) (Table 5).

Table 5. Correlation between DVAS and DVPS scales

		DVPS-Sexual violence	DVPS-Physical violence	DVPS-Psychological violence	Total DVPS
Total DVAS	r	-0.393	-0.468	-0.487	-0.507
	p	<0.001	<0.001	<0.001	<0.001
DVAS-General violence	r	-0.287	-0.341	-0.386	-0.383
	p	<0.001	<0.001	<0.001	<0.001
DVAS-Physical violence	r	-0.307	-0.337	-0.332	-0.377
	p	<0.001	<0.001	<0.001	<0.001
DVAS-Psychological violence	r	-0.287	-0.360	-0.353	-0.386
	p	<0.001	<0.001	<0.001	<0.001
DVAS-Economic violence	r	-0.280	-0.370	-0.368	-0.391
	p	<0.001	<0.001	<0.001	<0.001
DVAS-Sexual violence	r	-0.252	-0.340	-0.341	-0.356
	p	<0.001	<0.001	<0.001	<0.001

Discussion

Since dating violence can be exposed especially in younger ages, and dating violence causes serious consequences (2,15), it is an important field of study that should be examined in university students. In this context, we evaluated the experiences, attitudes and perceptions of medical students towards dating violence were evaluated.

In the literature, the percentages of exposure to dating violence among adolescents and university students are high. In a study conducted with university students in Turkey, 13.8% of students were exposed to violence in their dating relationships (18). In another study, the frequency of physical and sexual dating violence in adolescents was reported to be 20% and 9%, respectively (20). In our study, of the students having a current relationship 14.6% experienced dating violence in their current relationship. The percentages of experiencing psychological, physical and sexual violence in their current relationships were 13.6%, 2.9% and 1.0%, respectively, in our study. The percentages of exposure to dating violence among medical school students was found to be high in our study in a similar percentage when compared to the literature. The rate of exposure to sexual violence was found to be lower in our study compared to other study in the literature. The percentages of exposure to dating violence and types of exposed violences may vary between different societies depending on social norms and lifestyles. Being alert to different types of dating violence and develop preventive interventions for at-risk groups are necessary.

In the literature, there are many studies showing differences between gender and exposure to dating violence (7-10, 21). In our study, no significant relationship was found between gender and exposure to dating violence. This may be due to the different gender roles attributed to individuals in different cultures. For example in the patriarchal culture, the social roles are played by men and women have different powers. In this cultural vision, women are dominated and this situation causes men become strong and women become fragile. In these male-dominated cultures, even physical violence experienced by women are not perceived as violence by women and may be considered normal within the dating relationship (22,23).

In the literature, students who use alcohol are more exposed to dating violence (19). Similarly, in another study conducted in our country, university students who used alcohol were more exposed to dating violence (24). Also in our study, students who used alcohol and nicotine were exposed to dating violence more than those who did not. Alcohol use may cause difficulties in behavioral control and decrease in physical and cognitive functions in individuals (4, 25). This situation can lead people to aggressive behaviors and cause dating violence. On the other hand, students may turn to risky behaviors such as smoking and alcohol use during stressful periods (24). All these factors may have facilitated exposure to dating violence, as situations such as low self-confidence and motivation can be seen in students during the stressful period. Since the studies in the literature and our study were conducted in a cross-sectional design, it is difficult

to elucidate the cause-and-effect relationship of alcohol and smoking with dating violence. Thus, qualitative studies can be conducted to better understand the reasons why smokers and alcohol users are more exposed to dating violence.

According to the DVAS scores in our study, females and those who were not exposed to dating violence were less supportive of dating violence. Perception of dating violence as a problem is also higher in female and those who have not experienced dating violence. In addition, students who use alcohol in our study perceive dating violence as a problem less. According to a study in the literature, female university students have a higher perception of violence than males (18). In a study conducted with university students in faculties of health sciences, acceptance levels of female students towards dating violence were lower, similar to the results of our study (26). The fact that the perception of dating violence as a problem in our study was lower in those who experienced dating violence suggests that the students who were exposed to violence accepted this situation and normalized it. Violence against women is marked by social, cultural, psychological, and economic attributes ascribed to individuals based on their sex. This leads to the troubling perception of violence as a normal and allowing it to persist unnoticed in society (27). Since perceiving dating violence as normal can be a barrier to seeking help, there is a need to improve the perception of violence. For this reason, there is a need for informative and awareness-raising lessons about dating violence to be added to the education curriculum of the students. With psychological guidance and counseling services, students who are exposed to this situation and who have a tendency to violence should be provided with the necessary support and help. Dating violence preventions programs can be developed nationally taking into account the psychosocial needs of university students. In addition, further studies are needed to determine the role of alcohol use on dating violence perception.

In our study, according to the scale results; students mostly do not support physical and general violence and mostly perceive the physical type of violence as a problem. According to a similar study conducted with university students; students mostly perceive physical violence as a problem (28). In our study, although students were exposed to mostly psychological violence, they mostly accept the physical type of violence as a problem according to their scale scores. This is a serious situation that requires attention. It should be understood why psychological violence is seen as less of a problem although it is frequently experienced by students. Because the fact that the violence experienced is not seen as a problem may prevent students from help-seeking behaviour in this regard. According to the literature, observers around the victims often perceive the harm caused by psychological aggression as minimal, especially when compared to physical aggression. This is concerning because third-party perceptions of aggression tend to have a significant impact on the experiences of both victims and perpetrators of partner violence. Third parties may influence victims not to deny the psychological violence and minimizing it (29). Moreover, we think that the meaning attributed to the dating relationship, expectations of the relationship, existing mental problems such as anxiety, depression, and character traits related to obedience can be potential barriers to perceiving psychological violence as a problem. The fact that these factors were not questioned in our study is a limitation. With qualitative studies to be conducted in this field, the barriers to the perception of psychological violence as a problem should be examined and thus, specific interventions should be planned in the areas where students are in need. Interventions also should target to increase awareness of psychological violence among students and society.

In our study, attitude and perception scores of students were negatively correlated. This mean, students who show less supportive attitude towards dating violence are more likely to perceive dating violence as a problem. This result supports that the students answered the questions reflecting the truth while answering the questionnaire. Since the answers given to the scales are compatible, the probability of social desirability bias in the study is low.

Limitations and Strengths

The study was conducted with medical faculty students of a single university. Without systematic sampling, the participants were included in the study with the link of questionnaire sent via the mobile phones. This situation creates a limitation in representing the study results for the entire population. Another limitation of the study is that students who do not have WhatsApp application on their mobile phones could not participate in the study. In the study, the frequency of dating violence and related factors were examined; students' attitudes and perceptions towards dating violence were evaluated with the help of scales. With these aspects, the study has a big contribution to the literature with a broad perspective. This is the strength of our study.

Conclusion

Unfortunately, the percentage of exposure to dating violence is high in medical school students, similar to the studies conducted with other university and high school students. Students who experience dating violence are mostly exposed to psychological violence. Students who use alcohol and nicotine have been exposed to dating violence more than those who do not. In addition, according to the results of the study; female students have more anti-violence attitudes and perceptions than males. There is a need for interventions to be made especially for groups at risk for exposure to dating violence, and psychosocial support services to be offered to couples (30). In addition, it would be beneficial to conduct qualitative and quantitative studies that will investigate the reasons why young people tend to violence.

Declarations

Ethics Approval

Ethics committee approval was obtained on 07.10.2022 with the decision number of 09.2022.1162 from the clinical research ethics committee of the university where the study was conducted.

Acknowledgments

The authors are also grateful to the participants in this study.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Funding

This research received no specific grant from any funding agency, commercial entity, or not-for-profit organization.

Authors' Contributions

ZMA: Conceptualism, manuscript writing, data analysis, literature review, critical review.

SH: Conceptualism, manuscript writing, data analysis, literature review, critical review, supervision.

SDJ: Conceptualism, manuscript writing, data analysis, literature review, critical review.

MA: Conceptualism, data collection, data analysis, manuscript writing, literature review, critical review.

MA: Conceptualism, data collection, data analysis, manuscript writing, literature review, critical review.

MAA: Conceptualism, data collection, data analysis, manuscript writing, literature review, critical review.

FSA: Conceptualism, data collection, data analysis, manuscript writing, literature review, critical review.

Availability of Data and Material

Not applicable.

References

1. Intimate Partner Violence. Centers for Disease Control and Prevention (CDC). Preventing Teen Dating Violence. 2022. Available from: https://www.cdc.gov/violenceprevention/intimatepartnerviolence/index.html
2. World Health Organization. (2013). Responding to intimate partner violence and sexual violence against women WHO clinical and policy guidelines. https://apps.who.int/iris/bitstream/handle/10665/85240/9789241548595_eng.pdf?sequence=1
3. Medina-Maldonado V, Del Mar Pastor-Bravo M, Vargas E, et al. Adolescent dating violence: Results of a mixed study in Quito, Ecuador. J Interpers Violence. 2022;37(17-18):NP15205-NP15230. DOI: 10.1177/08862605211001471
4. Jennings WG, Okeem C, Piquero AR, et al. Dating and intimate partner violence among young persons ages 15–30: Evidence from a systematic review. Aggress Violent Behav. 2017; 33, 107-25. DOI: 10.1016/j.avb.2017.01.007
5. Dikmen HA, Özaydın T and Yılmaz SD. Üniversitedeki kadın öğrencilerde yaşanan flört şiddeti ile anksiyete ve umutsuzluk düzeyleri arasındaki ilişki. ACU Sağlık Bil Derg. 2018; 9(2):170-176. DOI: 10.31067/0.2018.9
6. Kütük EK, Gümüştaş F and Almiş BH. Üniversite öğrencisi kızlarda flört şiddetinin belirleyicileri ve psikiyatrik sonuçlar açısından flört dışı şiddetten farklılıkları. Anadolu Psikiyatri Derg. 2018; 19:217-222. DOI: 10.5455/apd.274195
7. Rivera-Rivera L, Allen-Leigh B, Rodríguez-Ortega G, et al. Prevalence and correlates of adolescent dating violence: baseline study of a cohort of 7,960 male and female Mexican public school students. Prev Med. 2007;44(6):477-484. DOI: 10.1016/j.ypmed.2007.02.020
8. Barros CR and Schraiber LB. Intimate partner violence reported by female and male users of healthcare units. Rev Saude Publica. 2017;51:7. DOI:10.1590/S1518-8787.2017051006385
9. Straus MA. Dominance and symmetry in partner violence by male and female university students in 32 nations. Child Youth Serv Rev. 2008; 30(3), 252-75. DOI: 10.1016/j.childyouth.2007.10.004
10. Centers for Disease Control and Prevention (CDC). Preventing Teen Dating Violence. 2022. Available from: https://www.cdc.gov/violenceprevention/intimatepartnerviolence/teendatingviolence/fastfact.html.
11. Şenol A, Albayrak İ and Uluman Mert M. Flört şiddeti tutumlarının belirli değişkenler ve romantik ilişkilerde akılcı olmayan inançlara göre incelenmesi. JRES 2022; 9(1), 113-131. DOI: 10.51725/etad.1028491
12. Kılınçer AS and Dost MT. Perceived abuse in romantic relationships among university students. Turkish Psychological Counseling and Guidance Journal. 2014; 5(42):160-172.

13. Yumuşak A. Üniversite öğrencilerinin flört şiddetine yönelik tutumları, toplumsal cinsiyetçilik ve narsisistik kişilik özellikleri arasındaki ilişki (Yüksek lisans tezi, Eğitim Bilimleri Ana Bilim Dalı, Rehberlik ve Psikolojik Danışma Bilim Dalı). Tokat; 2013.
14. Açıkgöz B, Açıkgöz B, Karakoyun AR, et al. Evaluation of violence in flirtous relationships among 5th and 6th grade students in a faculty of medicine. Konuralp Tıp Dergisi. 2018; 10(2):168-74. DOI: 10.18521/ktd.285138
15. Banyard VL and Cross C. Consequences of teen dating violence: understanding intervening variables in ecological context. Violence Against Women. 2008;14(9):998-1013. DOI: 10.1177/1077801208322058
16. Terzioğlu F, Gönenç İM, Özdemir F, et al. The validity and reliability of the dating violence scale. Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi. 2016; 19(4), 225-232.
17. Toplu-Demirtaş E, Öztemür G and Fincham FD. Perceptions of Dating Violence: Assessment and Antecedents. J Interpers Violence 2022;37(1-2):NP48-NP75. DOI: 10.1177/0886260520914558
18. Sünetçi B, Say A, Gümüştepe B, et al. Üniversite öğrencilerinin flört şiddeti algıları üzerine bir araştırma. Ufkun Ötesi Bilim Dergisi. 2016; 16(1), 56-83.
19. Calikoglu EO, Yerli EB and Tanriverdi E. Dating violence among university students: a cross-sectional study from Eastern Turkey. EJMI 2021; 5(1), 113. DOI: 10.14744/ejmi.2021.39890
20. Wincentak K, Connolly J and Card N. Teen dating violence: A meta-analytic review of prevalence rates. Psychol Violence 2017; 7(2): 224-241. DOI: 10.1037/a0040194
21. Díaz Olavarrieta C, Villa AR, Guerrero López B, et al. Dating violence among undergraduate medical students at a public university in Mexico City: an exploratory study. Int J Environ Res Public Health. 2023; 20(4):3104. DOI: 10.3390/ijerph20043104
22. Taquette SR and Monteiro DLM. Causes and consequences of adolescent dating violence: a systematic review. J Inj Violence Res, 2019;11(2):137-147. DOI: 10.5249/jivr.v11i2.1061
23. Barros CRS and Schairber LB. Intimate partner violence reported by female and male users of healthcare units. Rev Saude Publica. 2017; 51: 7. DOI: 10.1590/S15188787.2017051006385
24. İftar M and Güler G. Attitudes and behaviors of university students towards dating violence. International Anatolia Academic Online Journal Health Sciences 2020; 6(2),151-67.
25. Low S, Tiberio SS, Shortt JW, et al. Associations of couples' intimate partner violence in young adulthood and substance use: A dyadic approach. Psychol Violence. 2017; 7(1), 120. DOI: 10.1037/vio0000038
26. Öztürk R, Mete D, Altıntaş M, et al. Sağlık bilimleri öğrencilerinin flört şiddeti tutumlarının şiddete karşı profesyonel rolleri ile ilişkisi. TJFMPC. 2021; 15(1),142-53. DOI: 10.21763/tjfmpc.807519
27. Santos DF, Castro DS, Lima EFA, et al.The women's perception on the violence experienced. Rev Fund Care. 2017; 9(1):193-199. DOI: 10.9789/2175-5361.2017.v9i1.193-199
28. Çelik AK and Çelik SB. Ego in predicting dating violence in university students investigation of conditions and the role of early mismatched schemas. TEBD. 2022; 20(3), 911-29. DOI: 10.37217/tebd.1038390
29. Williams C, Richardson DS, Hammock GS, et al. Perceptions of physical and psychological aggression in close relationships: A review. Aggress Violent Behav. 2012;17(6), 489-494. DOI: 10.1016/j.avb.2012.06.005
30. Forty J. Do women with autonomy in the household experience less intimate partner violence in Malawi? Evidence from the 2015–16 Demographic and Health Survey. J Biosoc Sci. 2022; 54(6), 939-58. DOI: 10.1017/S0021932021000559

Acıbadem Univ. Sağlık Bilim. Derg. 2024; 15 (2)
https://doi.org/10.31067/acusaglik.1189559

Clinical Nurses ' COVID-19 Phobia And Professional Commitment During The Pandemic: Cross-Sectional Study

Kübra Gökalp[1], Ceylan Aksoy[2]

[1]Department of Psychiatric Nursing, Nursing Faculty, Atatürk University, Erzurum, Turkey

[2]Department of First and Emergency Aid,Vocational School of Health Services, İbrahim Çeçen University, Ağrı, Turkey

Kübra GÖKALP
0000-0003-2317-2166

Ceylan AKSOY
0000-0003-3815-3179

Correspondence: Kübra Gökalp
Assistant Professor, Department of Psychiatric Nursing, Nursing Faculty, Atatürk University, University Street, 25240, Erzurum,Turkey.
Phone: +9004422315665
E-mail: kubra.gungormus@atauni.edu.tr

Received: 21.10.2022
Accepted: 02.02.2024

ABSTRACT

Objective: This study, aims to determine the COVID-19 phobia levels and professional commitment of nurses during the pandemic and investigate the relationship between them.

Materials and methods: Data were collected from 283 clinical nurses during the COVID-19 pandemic between September 2020 and February 2021, using a Personal Information Form, COVID-19 Phobia Scale and Nursing Professional Commitment. The data were analyzed using multiple regression analysis and descriptive statistics.

Results: Results showed that COVID-19 phobia and nursing professional commitment of clinical nurses were above mean. Predictor variables explained 34% of the nursing professional commitment. It was determined that there was a relationship between the professional commitment and nurses' gender, confidence in personal protective equipment, whether they were contemplating resignation. It was observed that COVID-19 phobia negatively affected nursing professional commitment.

Conclusion: As a result of the study, it was found that the female gender, confidence in personal protective equipment positively affected and consideration of resignation negatively affected the nursing professional commitment. Within the scope of these results, eliminating the anxiety of nurses will increase them to be professional commitment.

Keywords: COVID-19, Mental Health, Workplace

ÖZET

Amaç: Bu araştırma, pandemide klinikte çalışan hemşirelerin COVID-19 fobisi ile mesleki bağlılık düzeylerini ve aralarındaki ilişkiyi belirlemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Eylül 2020 ile Şubat 2021 arasında COVID-19 salgını sırasında hastanede çalışan 283 klinik hemşiresinden Kişisel Bilgi Formu, COVID-19 Fobi Ölçeği ve Hemşirelikte Mesleğe Bağlılık Ölçeği kullanılarak veriler toplanmıştır. Verilerin analizinde, çoklu regresyon analizi ve tanımlayıcı istatistikler kullanılmıştır.

Bulgular: Araştırmadan elde edilen bulgular, klinik hemşirelerinin COVID-19 fobi düzeylerinin ve mesleki bağlılıklarının ortalamanın üzerinde olduğunu göstermiştir. Yordayıcı değişkenler, hemşirelik mesleğine bağlılığın %34'ünü açıklamıştır. Hemşirelerin cinsiyetleri, kişisel koruyucu donanıma güvenleri ve istifa etmeyi düşünüp düşünmedikleri ile hemşirelik mesleğine bağlılıkları arasında ilişki olduğu saptanmıştır. COVID-19 fobisinin hemşirelerin mesleki bağlılığını negatif yönde etkilediği belirlenmiştir.

Sonuç: Çalışma sonucunda, kadın cinsiyetin, kişisel koruyucu donanıma güvenin mesleki bağlılığı pozitif yönde ve istifayı düşünmenin ise mesleki bağlılığı negatif yönde etkilediği belirlenmiştir. Hemşirelerin COVID-19 fobisi arttıkça mesleki bağlılıklarının azaldığı tespit edilmiştir. Bu sonuçlar doğrultusunda hemşirelerin kaygılarının giderilmesi onların mesleki bağlılıklarını artıracaktır.

Anahtar Kelimeler: COVID-19, Ruh Sağlığı, İş Yeri

Coronavirus disease (COVID-19) is a new variant disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which started spreading in December 2019. The COVID-19, which has been rapidly proliferating around the world due to its unique properties, was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020 (1). At the time of writing this study (November 23, 2022), more than 635 million confirmed cases and more than 6,6 million deaths have been reported worldwide, and this number is increasing every day (2).

The COVID-19 pandemic has caused many physiological and psychological problems such as high infection and death rates, stress related to known and especially unknown information, financial difficulties, fear of uncertainty about the ongoing impact (3). Previous research shows that disasters and epidemics cause harmful emotions and disorders in the short and long run, such as phobias, anxiety, depression, hopelessness, and hostility (4-7). Nurses, who carry out the treatment, and care of COVID-19 patients, have developed psychological problems (4,8). Working in an environment with a virus that has no clear cure and can be easily transmitted from person to person, nurses risk their lives while dealing with life-and-death situations, and these circumstances have created a real sense of danger in them. Nurses fear being infected and potentially infecting their family members. Many healthcare professionals have been assigned to units outside their specialty, working longer shifts to meet the high patient demand (9). These difficulties has led to a decreases in the life satisfaction, motivation and productivity of nurses (10). These negativities may have damaged the professional commitment of nurses.

Nurses' professional commitment refers to their belief in, acceptance of, and dedication to realizing the value of the profession; it entails willingness to develop themselves in the professional field and determination to continue their work (11). Professional commitment has been determined to reduce anxiety, physical health symptoms, and turnover intention (12,13). In addition, it can also enhance the motivation (14), strengthen the intention of improving professional capabilities (15). The fears and psychological problems that develop in nurses who are at the frontline against COVID-19 have been thought to affect their determination and motivation to continue the profession. There are studies that separately analyzed the COVID-19 fears/phobia of nurses (4,10,16,17), and professional commitment of nurses (13,18). However, no study has examined their COVID-19 phobia together professional commitment during this period. The present research was conducted to determine the COVID-19 phobia levels and professional commitment of nurses during the pandemic and investigate the relationship between them.

Material and Methods

Study Design

This research has a cross-sectional descriptive design**.**

Study Population and Sample

The population of the research, located in east Turkey, consisted of 346 nurses working in hospitals between September 2020 and February 2021. The sample size was set to 283 nurses with a confidence level of t = 1.96, a sampling error of d = 0.03, and a frequency of p = 0.50. Considering the data losses, the sample size was planned to be 289 nurses (10% more of the calculated size). However, the sample included the 283 nurses who volunteered to participate in the study. Data were collected through an online self-report survey using Google Forms. The data collection form was shared on the social media platform (WhatsApp) as an online survey link with participants. Information about the research was given at this link to the participants, and the participating nurses filled out the questionnaire. It was provided to access the survey with an e-mail during the creation of the online form such that each nurse could respond only once. The collected questionnaires were checked daily, and quality control was conducted. Difficulties in information security tend to arise in social media research. However, in cases where data cannot be easily gathered in person, such as the COVID-19 outbreak, social media enables easy access to data.

Data Collection Tools

In the research, "Personal Information Form, COVID-19 Phobia Scale and Nursing Professional Commitment Scale" were used in this study.

Personal Information Form: This form consists of 4 questions examining the socio-demographic characteristics of nurses.

COVID-19 Phobia Scale (C19P-S): This scale was developed by Arpaci et al. (2020) to measure the phobia that can develop against coronavirus (3). The scale consisting of 20 questions. The scale score can range from 20 to 100. The scores indicate the intensity of the phobia. In Arpaci et al. (2020), the Cronbach alpha of the scale was 0.92. In the present study, it was 0.92 (3).

Nursing Professional Commitment Scale (NPCS): The scale was developed by Lu et al. (2000) (19). Turkish validity and reliability was made by Cetinkaya et al. (2015) (11). It is consisting of 26 questions. The scale score can range from 26 to 104. The scores indicate the strength of nursing professional commitment. In the original study, the scale was Cronbach's alpha = 0.94. In the validity–reliability study, Cronbach's alpha was calculated as 0.90. In the present study, it was 0.89.

Data Analysis

The package program SPSS 23.0 (IBM Corporation, New York, NY, USA) was used for data analysis. The normal distribution of variables was examined by the Kolmogorov–Smirnov test, Shapiro–Wilk test, and normality plots. Descriptive, minimum–maximum percentage, mean, standard deviation, frequency, and regression analyses were used to evaluate the data. In addition, Cronbach's alpha was calculated to evaluate the reliability of the scales. The limit of significance was set as $p < 0.05$.

Results

Nurses' demographic characteristics

The mean age of the participant nurses was 28.58±6.85 (min: 19, max: 55). Of the nurses, 72.8% were female. Among the nurses, 67.5% found personal protective equipment (PPE) reliable, and 23.7% were considering resignation (Table 1).

Levels of C19P-S, and NPCS

The nurses' mean C19P-S score was 54.12±15.52 (min: 20, max: 98), and their mean NPCS score was 69.23±13.23 (min: 33, max: 97) (Table 2).

Table 2. The distribution of the clinical nurses' mean scores on the C19P-S scores on the NPCS (n = 283)

Scale	*Mean*	*SD*	*Min*	*Max*
C19P-S	54.12	15.52	20	98
NPCS	69.23	13.23	33	97

C19P-S: COVID-19 Phobia Scale, NPCS: Nursing Professional Commitment Scale

Predictors of NPCS

The hierarchical method was chosen in the analysis, and it determined how age, gender, economic status, working experience, and the other demographic variables predicted NPCS in Model-1. Next, Model-2 was tested by C19P-S. (Table 3).

In Model 1:

In the model, it was determined that the independent variables explained 22.3% of the variance in NPCS (R^2= 0.234, Adj.R^2 = 0.223; F = 21.199; $p \leq 0.001$) (Table 3). Age (β = -0.011; p = 0.840), Gender (β = 0.140; p = 0.008), confidence in PPE (β = 0.269; $p \leq 0.001$), and resignation consideration status (β = – 0.351; $p \leq 0.001$) were found to be significantly related to nursing professional commitment. Accordingly, the female gender, and confidence in PPE positively affected the NPCS mean. Finally, consideration of resignation negatively affected the NPCS score (Table 3).

Table 1. Distribution of nurses by demographic characteristics

Demographic Characteristics(n=283)	**n**	**%**
Gender		
Female	206	72.8
Male	77	27.2
Confidence in personal protective equipment		
Yes	191	67.5
No	92	32.5
Resignation thinking status		
Yes	67	23.7
No	216	76.3
	Mean	**Sd***
Age	28.58	6.85

**Sd=Standard deviation*

Table 3. Multiple regression model for Nursing Professional Commitment Scale

Independent Variables Step 1: Control variables	Dependent Variable Nursing Professional Commitment Scale							
	Model-1				Model-2			
	B	β	t	p	B	β	t	p
Age	-0.021	-0.011	-0.203	0.840	0.017	0.009	0.179	0.859
Gender$_{(Female)}$	4.176	0.140	2.657	0.008*	4.271	0.143	2.951	0.003*
Confidence in personal protective equipment $_{(Yes)}$	7.612	0.269	5.094	≤0.001*	5.104	0.180	3.594	≤0.001*
Resignation thinking status$_{(Yes)}$	-10.948	-0.351	-6.586	≤0.001*	-9.170	-0.294	-5.913	≤0.001*
Step 2: Predictor variable								
COVID-19 Phobia Scale					-0.315	-0.362	-7.134	≤0.001*
Values								
R			0.483			0.594		
R^2			0.234			0.353		
Adjusted R^2			0.223			0.341		
R^2 Change			0.234			0.119		
F			21.199			30.183		
p			≤0.001*			≤0.001*		

*B: coefficient B; β: standardized beta coefficient; R^2: R-square (the coefficient of determination); * as statistical difference; Dummy coded: Gender (Female =1, Male =0); Confidence in personal protective equipment (Yes=1,No=0); Resignation thinking status (Yes=1,No=0)*

In Model 2:

In the model was tested by adding C19P-S to Model 1. The results showed that the predictor variables explained 34.1% of the NPCS variance with an 11.9% increase (R^2= 0.353, Adj.R^2 = 0.341; F=30.183). It was indicated that COVID-19 phobia negatively affected the NPCS score.

When this model was investigated in detailed way, predictive variables were listed from big to small in terms of the degree to affect professional commitment as below: C19P-S (β =–0.362; p ≤ 0.001), consideration of resignation (β = – 0.294; p ≤ 0.001), confidence in PPE (β = 0.180; p = p ≤ 0.001), and gender (β = 0.143; p = 0.003).

Discussion

The COVID-19 pandemic is negatively affecting the mental health of both society and healthcare professionals (20,21). Since nurses, who are at the front line of the healthcare system, their risk of contracting COVID-19 is higher than that of the general population. Therefore, nurses are worried about both their own health and the possibility of transmitting COVID-19 to family members, friends, and others (4,22,23). This study was conducted to examine nurses' level of COVID-19 phobia and its effect on their professional commitment. In the study, the nurses' COVID-19 phobia and professional commitment were above moderate. A study emphasized that healthcare workers have developed COVID-19 phobia, which has been affecting their mental health (16). Another study detected an above-intermediate fear of COVID-19 (10). Before and during the pandemic, there were studies that found nurses' professional commitment above moderate (13,18,24). The extra working hours, protective materials, more stressful hospital environment and disrupted social relationships negatively affected professional commitment of nurses (18). However, especially at the beginning of the COVID-19 process, the image of the nursing profession changed, and the nursing profession became more visible. People's awareness and positive thoughts about nurses increased during the COVID-19 pandemic (25). For this reason, it can be thought that the professional commitment of nurses were not affected by the pandemic process and nurses' professional commitment was determined at an above moderate level.

In the study, independent variables explained 34% of variance in professional commitment. Findings indicated that being female increased the nurses' professional commitment. In a study conducted on healthcare professionals working in a hospital, the professional emotional commitment and normative commitment levels of women were found to be higher than those of men (26). The social duties imposed on women and men may have cause changes in the perspectives of them in business life. Culturally, men are expected to income for household needs. While the salary received from nursing is not satisfactory for men, it may be sufficient for women (27). For this reason, women may have high professional commitment.

In this study, findings indicated that those who intend to resign from the profession had lower professional commitment. According to a study conducted in China, employees state that they can go home but are afraid to do so. This situation causes an increase in one's intent to resign (28). A study reported that nurses and midwives working in delivery rooms during an Ebola epidemic fear going to work, which reduces their enthusiasm toward the profession (29). In a study conducted on nurses in Turkey showed that intended to leave the profession were affected professional commitment (18).

The results showed that the predictor variables explained 34% of the professional commitment variance with an 11.9% increase. According to the present study, COVID-19 phobia negatively affected the nursing professional commitment. Zhang et al. (30) research result showed that perceived stress could have significantly influence professional identity of nurses during the pandemic. Nurses during the pandemic faced problems, such as increasing stress, getting infect, transmitting the infection to their relatives, new working styles, many uncertainties and severe information pollution, information of new information, ever-changing practices, working extra shifts, and longer hours (9,27). Therefore, these problems may lead to worse mental health of nurses, lose their compliance by questioning their profession.

This cross-sectional study is limited to reflecting only those conditions experienced during the data collection process. Due to limited access to samples, data collection forms were sent online. The results may have been affected by number of patients and working environment. In order to minimize the impact of these factors, future studies should be conducted in larger sample groups and various hospitals.

Conclusion

The results of this study indicated that frontline nurses' COVID-19 phobia and their professional commitment were above the mean level. Gender, confidence in PPE, and whether they were contemplating resignation were significantly related to nursing professional commitment, and independent variables explained 34% of their nursing professional commitment. As a result of the study defined that COVID-19 phobia was negative affect to nursing professional commitment. Hence, nurses should be supported in dealing with the psychological, sociological, and emotional problems that occur in a pandemic. Improving mental healthcare and psychosocial interventions will be an important investment in terms of maintaining the mental health and increasing the professional commitment of nurses for possible pandemics in the future. It is crucial to maintain and enhance nurses' professional commitment and mental health, in order to ensure that nurses work effectively and safely, and to increase of care quality.

Declarations

Funding

Not applicable

Conflicts of interest/Competing interests

Conflict of interest statement declared by the corresponding author on behalf of all authors: The authors whose names are listed certify that they have not conflicted of interest statement about personal or professional relationships, any financial interests in this manuscript. The authors confirm their specific contributions to the work presented. The authors are in agreement on the conclusions, implications or opinions stated in the manuscript reported. All authors give consent to submission and publication of the work. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication.

Ethics approval

Permission for data collection was obtained from the university ethics committee and the institution (No. B.30.2.ATA.0.01.00). The nurses included in the study were informed online about the aim of the study, that personal information would be kept confidential, and that the information obtained from them would only be used for scientific purposes.

Availability of data and material

Not applicable

Authors' contributions

Concept – KG,CA; Design - KG,CA; Supervision –Data Collection and/or Processing - CG; Analysis and/or Interpretation - KG; Literature Search - KG,CA; Writing Manuscript - KG,CA; Critical Review - KG,CA

References

1. Preti E, Di Mattei V, Perego G, et al. The psychological impact of epidemic and pandemic outbreaks on healthcare workers: rapid review of the evidence. Current Psychiatry Reports. 2020;22.8:1-22. DOI:10.1007/s11920-020-01166-z
2. World Health Organization (2019). Coronavirus diseases pandemic. https://www.who.int/emergencies/diseases/novel-coronavirus-2019. Accessed at:21.02.2021.
3. Arpaci I, Karataş K, Baloglu M. The development and initial tests for the psychometric properties of the Covıd-19 Phobia Scale. PAID. 2020;164:110108. DOI: 10.1016/j.paid.2020.110108
4. Yildirim M, Arslan G, Ozaslan A. Perceived risk and mental health problems among healthcare professionals during COVID-19 pandemic: exploring the mediating effects of resilience and coronavirus fear. IJMH. 2020;1-11. DOI:10.1007/s11469-020-00424-8
5. Al Maqbali M, Al Khadhuri J. Psychological impact of the coronavirus 2019 (COVID-19) pandemic on nurses. JJNS. 2021;18(3):e12417. DOI: 10.1111/jjns.12417
6. Crismon D, Mansfield KJ, Hiatt SO, et al. COVID-19 pandemic impact on experiences and perceptions of nurse graduates. Journal of Professional Nursing. 2021;37(5):857-65. DOI: 10.1016/j.profnurs.2021.06.008
7. Thomas LMB. Stress and depression in undergraduate students during the COVID-19 pandemic: Nursing students compared to undergraduate students in non-nursing majors. Journal of Professional Nursing. 2022;38:89-96. DOI: 10.1016/j.profnurs.2021.11.013
8. Salopek-Žiha D, Hlavati M, Gvozdanović Z, et al. Differences in distress and coping with the COVID-19 stressor in nurses and physicians. Psychiatria Danubina. 2020;32(2):287-93. DOI:10.24869/psyd.2020.287
9. Shreffler J, Petrey J, Huecker M. The impact of Covid-19 on healthcare worker wellness: a scoping review. West J E M. 2020;21(5):1059. DOI: 10.5811/westjem.2020.7.48684
10. Labrague LJ, De Los Santos JAA. Fear of Covid-19, psychological distress, work satisfaction and turnover intention among frontline nurses. Journal of Nursing Management. 2021;29(3):395-403. DOI: 10.1111/jonm.13168
11. Cetinkaya A, Ozmen D, Temel AB. The study of reliability and validity of nursing professional commitment scale objectives. E-Journal of Dokuz Eylul University Nursing Faculty. 2015;8:54-60.
12. Guerrero S, Chênevert D, Kilroy S. New graduate nurses' professional commitment: Antecedents and outcomes. Journal of Nursing Scholarship. 2017;49(5):572-79. DOI:10.1111/jnu.12323
13. Özkan Şat S, Akbaş P, Yaman Sözbir Ş. Nurses› exposure to violence and their professional commitment during the COVID-19 pandemic. JCN. 2021;30:2036-47. DOI: 10.1111/jocn.15760
14. Galletta M, Vandenberghe CB, Portoghese I, et al. A cross-lagged analysis of the relationships among workgroup commitment, motivation and proactive work behaviour in nurses. Journal of Nursing Management. 2019;27(6):1148-58. DOI: 10.1111/jonm.12786
15. Chang HY, Huang TL, Lee IC, et al. Impact of professional commitment on professional capability improvement and care quality dimensions: A multi-wave study. JCN. 2021;30(9-10):1285-94. DOI: 10.1111/jocn.15672
16. Amin S. The psychology of coronavirus fear: Are healthcare professionals suffering from corona-phobia?. International Journal of Healthcare Management. 2020;13(3):249-56. DOI: 10.1080/20479700.2020.1765119
17. Kaya H, Civan Kahve A, Gökçe Saykal S, et al. Evaluation of anxiety, burnout and psychological resilience levels of healthcare workers in the COVID-19 pandemic. Acıbadem Üniv Sağlık Bilimleri Derg. 2022;13(1): 57-66. DOI: 10.31067/acusaglik.983582
18. Duran S, Celik I, Ertugrul B, et al. Factors affecting nurses' professional commitment during the COVID-19 pandemic: A cross-sectional study. Journal of Nursing Management. 2021;29(7):1906-15. DOI: 10.1111/jonm.13327
19. Lu KY, Chiou SL, Chang YY. A study of the professional commitment changes from nursing students to registered nurses. KJMS. 2000;16(1):39-46.
20. Hu W, Su L, Qiao J, et al. COVID-19 outbreak ıncreased risk of schizophrenia in aged adults. PsyChinaXiv. 2020;1:2-4.
21. Huang L, Rong Liu H. Emotional responses and coping strategies of nurses and nursing college students during Covid-19 Outbreak. PLoS ONE. 2020;15(8):e0237303. DOI:10.1371/journal.pone.0237303
22. Aksoy YE, Koçak V. Psychological effects of nurses and midwives due to COVID-19 outbreak: The case of Turkey. Archives of Psychiatric Nursing. 2020;34(5):427-33. DOI:10.1016/j.apnu.2020.07.011
23. Yigitoglu GT, Yilmaz A, Yilmaz H. The effect of Covid-19 on sleep quality, anxiety and depression on healthcare staff at a tertiary hospital in Turkey. Archives of Psychiatric Nursing. 2021,35(5):504-10. DOI: 10.1016/j.apnu.2021.07.001
24. Gökalp K. The professional commitment of nurses belonging to different generations. JHNM. 2021;8(2):214-20. DOI:0.5222/SHYD.2021.91069
25. Gökalp K, Sarioglu Kemer A. Mothers' and children's thoughts on COVID-19: A qualitative study. JPN. 2022;67:38-43. DOI:10.1016/j.pedn.2022.07.022
26. Küçüközkan Y. Relation between organizational commitment and gender: a research on health care staff working in hospitals. YONBIL. 2015;1(1):14-37.
27. Zeybekoglu Akbaş Ö, Dursun C. Mothers interpolating public space into private space during the coronavirus (Covid-19) pandemic. EJRSE. 2020;7(5):78-94.
28. Juan Y, Yuanyuan C, Qiuxiang Y, et al. Psychological distress surveillance and related impact analysis of hospital staff during the COVID-19 epidemic in Chongqing, China. Comprehensive Psychiatry. 2020;103:152-98. DOI:10.1016/j.comppsych.2020.152198
29. Kollie ES, Winslow BJ, Pothier P, et al. Deciding to work during the ebola outbreak: the voices and experiences of nurses and midwives in Liberia. IJANS. 2011;303(2):225-8. DOI:10.1016/j.ijans.2017.09.002
30. Zhang YD, Gao YQ, Tang Y, et al. The role of workplace social capital on the relationship between perceived stress and professional identity among clinical nurses during the COVID-19 outbreak. JJNS. 2021;18(1):e12376. DOI: 10.1111/jjns.12376

https://doi.org/10.31067/acusaglik.1319964

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Psychiatry /Psikiyatri

The Role Of Basic Personality Traits and Coping in Social Anxiety Symptoms

Şebnem Akan[1] Dilara Birtek[2]

[1]Acıbadem Mehmet Ali Aydınlar University, Faculty of Humanities and Social Sciences, Department of Psychology, İstanbul-Turkey

[2]Basaksehir Cam ve Sakura City Hospital, Mental Health and Diseases Hospital, Specialist Psychologist, İstanbul-Turkey

Şebnem Akan

0000-0002-9499- 8961

Dilara Birtek

0000-0002-3864- 7956

Abstract

Purpose: The aim of this study is to examine the role of personality traits and coping mechanisms in social anxiety symptoms within the scope of predisposing and maintaining risk factors.

Methods: The study group consists of 505 participants (52.3% female) aged between 20 and 40 enrolled in various private universities in Istanbul. Data collection tools include Liebowitz Social Anxiety Scale, Basic Personality Traits Scale, Ways of Coping with Stress Scale, Cognitive Emotion Regulation Scale.

Results: In the study, Multivariate Analysis of Variance (MANOVA) and Hierarchical Regression Analysis are employed. It is observed that participants with low and high social anxiety symptom levels differed in terms of (I) extraversion, agreeableness, openness and negative valence among personality traits; (II) self-confident approach, helpless approach and submissive approach among stress coping styles; (III) refocusing on the plan, positive reappraisal and catastrophizing among cognitive emotion regulation strategies. Additionally, hierarchical regression analysis reveals that (I) extraversion, openness and negative valence; (II) helpless approach and submissive approach; and (III) putting into perspective predict social anxiety.

Conclusion: The study supported the role of personality traits, ways of coping with stress and cognitive emotion regulation strategies in social anxiety symptoms. These findings provide evidence that extraversion, openness to experience, negative valence personality traits along with the helpless and submissive approach of stress coping styles could serve as both maintaining and predisposing risk factors in understanding of social anxiety symptoms. As a result, the specified psychological constructs may contribute to the development of cognitive-behavioral intervention programs for the treatment of social anxiety symptoms in university students.

Key words: Social anxiety symptoms, personality, coping with stress, cognitive emotion regulation.

Özet

Amaç: Bu çalışmanın amacı, kişilik özelliklerinin ve başa çıkma tarzlarının toplumsal kaygı belirtilerindeki rolünü yatkınlaştırıcı ve sürdürücü risk faktörleri kapsamında incelemektir.

Yöntem: Araştırma grubu, İstanbul'daki çeşitli özel üniversitelerde öğrenim gören, yaşları 20-40 arasında değişen 505 katılımcıdan (%52,3'ü kadın) oluşmaktadır. Çalışmada Liebowitz Sosyal Anksiyete Ölçeği, Temel Kişilik Özellikleri Ölçeği, Stresle Başa Çıkma Tarzları Ölçeği, Bilişsel Duygu Düzenleme Ölçeği veri toplama araçları olarak kullanılmıştır. Bulgular: Araştırmada Çok Değişkenli Varyans Analizi (MANOVA) ve Hiyerarşik Regresyon Analizi kullanılmıştır. Toplumsal kaygı belirti düzeyi düşük ve yüksek olan katılımcıların (I) kişilik özelliklerinden dışadönüklük, uyumluluk, açıklık ve negatif değerlik; (II) stresle başa çıkma tarzlarından kendine güvenli yaklaşım, çaresiz yaklaşım ve boyun eğici yaklaşım; (III) bilişsel duygu düzenleme stratejilerinden plana yeniden odaklanma, olumlu yeniden değerlendirme ve felaketleştirme açısından farklılaştığı görülmüştür. Ayrıca, hiyerarşik regresyon analizine göre (I) dışadönüklük, açıklık ve negatif değerliğin; (II) çaresiz yaklaşım ve boyun eğici yaklaşımın; ve (III) olayın değerini azaltma bilişsel duygu düzenleme stratejisi toplumsal kaygı belirtilerini yordamaktadır.

Sonuç: Bu çalışma toplumsal kaygı belirtilerinde kişilik özelliklerinin, stresle baş etme tarzlarının ve bilişsel duygu düzenleme stratejilerinin rolünü desteklemektedir. Bulgular, dışadönüklük, deneyime açıklık, olumsuz değerlik kişilik özelliklerinin yanı sıra stresle başa çıkma tarzlarındaki çaresiz ve boyun eğici yaklaşımın, toplumsal kaygı belirtilerinin kavramsallaştırılmasında hem sürdürücü hem de yatkınlaştırıcı risk faktörleri olabileceğine işaret etmektedir. Sonuç olarak, belirtilen psikolojik yapılar üniversite öğrencilerinde toplumsal kaygı belirtilerinin tedavisinde bilişsel-davranışçı yönelimli müdahale programlarının geliştirilmesine katkı sağlayabilir.

Anahtar Sözcükler: Toplumsal kaygı belirtileri, Kişilik, Stresle başa çıkma tarzları, Bilişsel duygu düzenleme.

Correspondence:
Şebnem Akan, Acıbadem Mehmet Ali Aydınlar Üniversitesi
Phone: +90 (505) 940 07 18
(216) 500 4275
E-mail: sebnem.akan@acibadem.edu.tr

Received: 26 June 2023
Accepted: 24 October 2023

Symptoms

Social anxiety disorder (SAD) is a psychiatric condition characterized by experiencing anxiety and fear in different social interactions during which individuals may feel humiliated, shamed or evaluated negatively (1). Given that SAD is among the most common disorders in young adults (24) and significantly impacts educational attainment, interpersonal relationships and professional life (10), the underlying mechanisms and characteristics of the disorder need to be elucidated for the development and implementation of evidence-based interventions.

The prominent cognitive-behavioral models in SAD elaborate on predisposing and maintaining factors that make it difficult for people to cope with the negative emotions they experience during social interactions in their daily lives (8). Personality is among the predisposing factors related to how a person reacts to a stressful and anxiety-producing events (24). Among all proposed models, the five-factor model of personality (19) has been widely accepted, used for research purposes and also allows for a systematic examination of the relationships between personality traits and psychopathology. This model defines personality based on five traits: neuroticism, extraversion, openness, agreeableness and conscientiousness (29).

In the etiological explanations of SAD, there is a widespread emphasis on personality traits, especially neuroticism and extraversion (4) Although it is proposed that high neuroticism and low extraversion are significantly related to the disorder in both epidemiological and clinical samples (17,28), a growing body of work has indicated that the other five-factor personality traits, such as openness, agreeableness and conscientiousness may also characterize individuals with SAD (17). Thus it is suggested that greater attention to these personality traits can significantly benefit SAD psychopathology research and clinical practice (16). However the initial evidence regarding the relationships between openness, agreeableness, conscientiousness and SAD is inconclusive. For example in one study individuals with high levels of social anxiety reported lower scores in the agreeableness and conscientiousness compared to the control group (5). In another study conducted with only female university students in Iran, it was found that while social anxiety symptoms were negatively associated with agreeableness and conscientiousness, these traits are not significant predictors of social anxiety (23). The meta-analysis evaluating the contribution of personality traits to psychopathology established that SAD is negatively associated with extraversion but not related to agreeableness and openness to experience (16).

The coping strategies, closely associated with personality traits (7) are considered as factors contributing to the mainteinance of SAD (8). Coping is a very broad concept and several classifications of coping have been proposed but the fundamental categories that have garnered the most consensus include emotion and problem focused coping (7). While problem-focused coping which attempts to change the situation is defined as a adaptive strategy, emotion-focused coping which attempts to alter one's emotional reaction to a situation is defined as a maladaptive strategy (18). According to the research (11) in middle childhood emotion-focused coping strategies are found to have a predictive role in shyness behaviours. Another study (3) has demonstrated that university students who more frequently engage isocial avoidance behaviors more frequently use emotion-focused coping strategies and have lower problem-solving skills, emphasizing the importance of problem-solving ability in social anxiety. Furthermore, In Greece, a problem-focused group intervention program lasting for 5 weeks is implemented for students who exhibited symptoms of social anxiety upon entering middle school. It is observed that as students began to employ problem-focused coping strategies, there is a decrease in social anxiety symptoms as measured by self-report scales (6). Although there is growing evidence suggesting that emotion-focused coping might have an important role in social anxiety, the general lack of uniformity in the taxonomies of emotion-focused coping responses makes it difficult to understand through which strategies this coping emerges within the disorder.

Another cognitive coping mechanism that plays a maintaining role for social anxiety is cognitive emotion regulation (CER) (7). This concept encompasses only the cognitive processes of emotion regulation and includes maladaptive strategies such as self-blame, rumination, catastrophizing, other-blame, acceptance and adaptive strategies such as positive refocusing, refocus on planning, positive reappraisal, and putting into perspective strategies (12). Emprical studies focused on a limited number of CER strategies, such as cognitive reappraisal, rumination and catastrophizing have revealed inconsistencies regarding the role of these strategies in SAD. For example, some studies have found that clinically anxious young (14) and middle aged (26) individuals frequently use rumination but they are ineffective in using cognitive reappraisal, while others have failed to find this association (15). In a review article it is asserted that socially anxious individuals tend to use more catastrophic thinking strategies in interpersonal situations compared to participants with other anxiety-related disorders (2).
Taken together, the existing literature has provided consistent evidence for the links between social anxiety, personality traits and coping strategies, however uncertainities and incompatibilities draw attention so it is not clear which personality traits and cognitive coping strategies would play a role in the etiology of SAD.

Various etiological models have been proposed to explain predisposing and maintaining factors in psychopathology. Some of these models include vulnerability and pathoplasty model. According to the pathoplasty model the presence of psychopathology affects other psychological processes independently of etiology and contributes to the persistence of psychopathologies. In vulnerability model predictor variables have been suggested to increase the risk of developing certain anxiety disorders. In psychopathologies the clearest support for these models would be provided by longitudinal data, in cross-sectional studies, only risk factors can be considered (20). To gain insight into predisposing and maintaining risk factors within the scope of these models, firstly, risk and non-risk groups for social anxiety symptoms were formed to determine if these groups differ in terms of personality traits, coping styles with stress, and cognitive emotion regulation strategies. Secondly, the predictive effects of personality traits, coping styles with stress, and cognitive emotion regulation strategies on social anxiety examined across the entire sample.

Method

Sample

The participants consisted of 505 students attending various faculties of different private universities in Istanbul. Of the participants, 265 (52.3%) are female and 240 (47.7%) are male. The age of the participants ranged from 20 to 40 years (M = 21.8, SD = 2.80). The scales were distributed and collected in person by the researchers.

Liebowitz Social Anxiety Scale

This Scale developed to assess the level of anxiety and avoidance experienced in social interaction situations is adapted to Turkish sample by Soykan, Özgüven and Gençöz (27). Higher scores on the scale indicate greater severity of social anxiety and avoidance behaviors. During scoring, the score of the two sub-dimensions is calculated separately and the total score is calculated. In this study, the Cronbach's alpha coefficient for the total score of the scale is found to be .94.

Inventory of Basic Personality Traits

This scale is developed to examine the five-factor structure of personality in Turkish culture. Although the five-factor structure of personality is supported, it is also found that the 6th dimension of personality is called negative valence. The subscales included agreeableness, neuroticism, conscientiousness, extraversion, openness to experience, and negative valence. The Cronbach's alpha coefficients of the subscales range from .71 to .89 (13). In the current study, the Cronbach's alpha coefficients of the subscales are found to vary between .60 and .83.

Ways of Coping with Stress Scale

The scale is rated on a 4-point Likert scale and converted into a 30-item short form by Şahin and Durak (28). The scale consists of five sub-dimensions: self-confident, seeking social support, optimistic approach are adaptive; helpless and submissive approaches are maladaptive. The Cronbach's alpha coefficients of the sub-dimensions range from .45 to .73. In the current study, the Cronbach's alpha coefficients of the sub dimension range from .60 to .79.

Cognitive Emotion Regulation Scale

This scale aims to measure the cognitive emotion regulation strategies used by participants both in stressful/ negative life events and in general situations. There is nine subscales and Cronbach's alpha coefficients of the subscales ranged from .62 to .77 in Turkish culture (25). In the current study, the Cronbach's alpha coefficients of the scale range from .64 to .81 for the sub-dimensions.

Results

Analysis on Variables Differentiating Groups with High and Low Social Anxiety Symptom Levels

The research data is analyzed using SPSS 25 program. To determine the groups with high and low levels of social anxiety symptoms (SAS), mean (M=86.21) and standard deviation (SD=22.15) values were calculated based on the total scores of Liebowitz Social Anxiety Scale (LSAS). Those who scored 1 standard deviation below the mean is named as the low group (N=87) and those who scored 1 standard deviation above the mean is named as the high group (N=92).

One Way MANOVA was applied to determine whether participants differed in terms of research variables. According to the analysis, it is observed that subscales of Inventory of Basic Personality Traits (IBPT) (Wilks' Lambda = .29, F[6, 172]= 11.99, p<.01), subscales of Ways of Coping with Stress Scale (WCSS) (Wilks' Lambda = .72, F[5, 173]= 13.23, p<.01) and subscales of Cognitive Emotion Regulation Scale (CERS) (Wilks' Lambda = .77, F[9, 169]= 5.65, p<.01) significantly differed between the groups.

One-way Analysis of Variance is conducted to determine which subscales would be in the differentiation. It is found that groups differed significantly in subscales of the (IBPT), neuroticism (F[1-177] = 3.89, p<.05), extraversion (p<.01), agreeableness (F[1-177] = 7.15), openness to experience (F[1-177] = 50.41, p<.01) and negative valence (F[1-177] = 6.22, p<.01). Mean scores of extraversion (M=4.22, SD=.56), agreeableness (M=4.36, SD=.48), openness to experience (M=4.19, SD=. 48) of the group with high SAS were significantly higher than the mean scores of extraversion (M=3.47, SD=.82), agreeableness (M=4.13, SD=.66) and openness to experience (M=3.55, SD=.69) subscales of the group with low SAS. The mean scores of the negative valence (M=1.82, SD=.60) and neuroticism subscales (M=2.88, SD=.76) of the group with high SAS level were higher than the mean scores of the negative

valence (M=1.62, SD=.49) and neuroticism (M=2.67, SD=.64) subscales of the group with low social anxiety symptom level.

Participants significantly differed in the subscales of WCSS, confident (F[1, 177] = 21.57, p<.01), helpless (F[1, 177] = 37.99, p<.01), and submissive (F[1, 177] = 36.88, p<.01) subscales. The mean scores of the group with low SAS in confident (M=2.30, SD=.48) are higher than the mean scores of the group with high SAS (M=1.94, SD=.53). The mean scores of helpless (M=1.41, SD=.53) and submissive (M=1.20, SD=.57) subscales of the participants with high SAS are higher than the mean scores of helpless (M=.97, SD=.43) and submissive (M=.75, SD=.41) subscales of the participants with low SAS.

Also, participants differ significantly in the subscales of CERS, refocusing on planning (F[1, 177] = 16.27, p<.01), positive reappraisal (F[1, 177] = 8.84, p<.01), and catastrophizing (F[1, 177] = 20.50, p<.01). Accordingly, the mean scores of refocusing on the plan (M=15.92, SD=2.90) and positive reappraisal subscales (M=15.54, SD=3.12) of the participants with low SAS level are higher than the mean scores of refocusing on the plan (M=14.18, SD=2.85) and positive reappraisal subscales (M=14.13, SD=3.22) of the high level participants. The mean catastrophizing scores of the group with high SAS level (M=10.96, SD=3.55) are higher than the mean catastrophizing scores of the participants with low SAS (M=8.69, SD=3.10). The results are presented on Table1.

TABLE 1: Statistical Analysis of Scale Scores of Participants with High and Low Social Anxiety Symptom Levels.

Social Anxiety Symptom Level Groups						
Subscales	Low		High		F	η2
	M	Ss	M	Ss		
IBPT						
Extraversion	4.22	.56	3.47	.82	49.50*	.219
Conscientiousness	3.67	.69	3.61	.72	.39	.002
Agreeableness	4.36	.48	4.13	.66	7.15*	.039
Neuroticism	2.67	.64	2.88	.76	3.88*	.021
Openness to experience	4.19	.48	3.55	.69	50.41*	.222
Negative valence	1.62	.49	1.82	.60	6.22*	.034
WCSS						
Seeking of social support	1.99	.60	1.85	.52	2.85	.016
Self confident	2.30	.48	1.94	.53	21.57*	.109
Optimistic	1.80	.54	1.69	.58	1.74	.010
Helpless	.97	.43	1.41	53	37.99*	.177
Submissive	.75	.41	1.20	.57	36.88*	.172
CERS						
Self blame	9.92	2.63	10.83	2.88	4.85	.027
Acceptance	10.38	2.99	11.05	2.94	2.31	.013
Rumination	13.56	3.12	13.80	3.25	.26	.001
Positive Refocusing	12.47	2.78	12.57	3.32	.04	.000
Refocus on planning	15.92	2.90	14.18	2.85	16.27*	.084
Positive reappraisal	15.54	3.12	14.13	3.22	8.84*	.048
Putting into perspective	12.89	2.81	13.57	3.04	2.40	.013
Catastrophizing	8.69	3.10	10.96	3.55	20.50*	.104
Other-Blame	9.96	3.01	10.46	3.29	1.19	.006

*p < .05, BPTS: Basic Personality Traits Scale, WCSS: Ways of Coping with Stress Scale, CERS: Cognitive Emotion Regulation Scale

Hierarchical Regression Analysis Findings on the Prediction of Social Anxiety Symptoms by Research Variables

The correlation between the total score of the LSAS and the subdimensions of the other scales was examined using Pearson's correlation coefficient analysis. The total score of LSAS is significantly correlated with extraversion, agreeableness, neuroticism, openness to experience, and negative valence subscales (in turn r=-0.33, p<.05; r=-0.12, p<0.05, r=0.10, p<.05; r=-0.32, p<.05; r=0.12, p<.05). The total score of LSAS is significantly correlated with the self-confident approach, helpless approach, and submissive approach subscales (in turn r=-0.23, p<.05; r=-.32, p<.05, r=-0.32, p<.05). The total score of LSAS is significantly correlated with the self-blame, refocus on planning, positive reappraisal, catastrophizing, and putting into perspective subscales (in turn r=.11, p<.05; r=-0.18, p<.05; r=-0.14, p<.05, r=-0.21, p<.05, r=-0.10, p<.05). Only subscales that showed significant correlations with the LSAS are included in the regression analysis.

To examine the effects of subscales on LSAS total score, hierarchical stepwise multiple linear regression analysis is conducted. The subscales of openness, extraversion and negative valence (in turn β= -.21, p <.001; β= -.23, p < .001, β= 23, p< .001) predicts LSAS total score and all subscales explain %14 of total variance. In the second stage the subscales of helpless approach and submissive approach (in turn β= .12, p< .01; β= .22, p< .001) predict LSAS total score and all subscales explains 22% of total variance. In the third stage the subscale of putting into perspective predicts LSAS total score (β= .10, p<.05) and all subscales explains 24% total variance. The results are presented on the Table 2.

TABLE 2: Hierarchical Stepwise Multiple Linear Regression Analysis Results for the Prediction of Liebowitz Social Anxiety Scale Total Score

Analysis Phase	Predictor variable Subscales	R	R2	ΔR2	B	SH_B	β	t	F
1. Stage	BPTS								
	Extroversion	.39	.15	.14	-6.26	1.49	-.21	-4.19***	14.43*
	Agreeableness				2.54	2.17	.06	1.17	
	Neuroticism				.33	1.44	.01	.23	
	Openness				-8.34	1.84	-.23	-4.55***	
	Negative valence				4.09	2.09	.10	2.08*	
2. Stage	WCSS								
	Self confident	.48	.23	.22	9.59	2.02	-.04	-.73	18.32*
	Helpless				-1.48	2.18	.12	2.51**	
	Submissive				5.46	1.99	.22	4.82***	
3. Stage	CERS								
	Self blame	.50	.25	.24	-.89	.39	-.09	-1.27	12.53*
	Refocus on planning				-.82	.48	-.11	-1.71	
	Positive reappraisal				.48	.49	.07	.98	
	Putting into perspective				.68	.34	.10	1.99*	
	Catastrophizing				.52	.32	.08	1.63	

*p < .05, BPTS: Basic Personality Traits Scale, WCSS: Ways of Coping with Stress Scale, CERS: Cognitive Emotion Regulation Scale

Discussion

The present study examines the role of the five-factor personality traits, cognitive emotion regulation strategies and stress coping styles in social anxiety symptoms among university students. The first variable examined in individuals with both high and low levels of social anxiety is the five-factor personality traits. The findings demonstrate that socially anxious individuals would be defined by personality profile with high neuroticism and negative valence; low extraversion, agreeableness and openness to experience. Thus it can be considered that individuals with social anxiety might have a personality profile that reflects different manifestations of more than one personality trait rather than have just high neuroticism as reported by some of the previous research (17). On the other hand these findings are consistent with theoretical and empirical literature. For example, Costache et al (9) emphasize that socially anxious individuals exhibit a personality profile with higher neuroticism and lower extraversion compared to the control groups. Furthermore, that the findings of extraversion, openness to experience, and agreeableness which are related to interpersonal relationships (19), are low in socially anxious individuals is consistent with the theory that individuals with social anxiety disorder (SAD) often experience difficulties in interpersonal relationships (3). Our findings regarding the high presence of negative valence personality trait, indicating negative self-attributions about oneself (13), on elevated social anxiety symptoms, support cognitive model of SAD, which hypothesize the importance of negative self-beliefs such as inadequacy and worthlessness in maintaining the disorder (8).

With regard to coping with stress, our findings indicate that individuals with high socially anxious have lower levels of self-confident approach and higher levels of helpless and submissive approaches compared to individuals with low social anxiety. These results expand upon previous research (3,12) by illustrating that socially anxious individuals tend to utilize adaptive strategies less frequently and employ multiple maladaptive strategies.
Regarding cognitive emotion regulation strategies, it is found that individuals with high social anxiety exhibit lower scores in plan refocusing and positive reappraisal and higher scores in catastrophising compared to those with low social anxiety symptoms. The results replicate the findings of Rukmini et al. (26), indicating that participants diagnosed SAD use fewer adaptive strategies compared to healthy controls. On the other hand, when considered within the framework of the pathoplastic model, one could hypothesize that the personality traits and coping mechanisms differing between high and low symptom groups may serve as maintaining risk factors for social anxiety.

The symptoms of social anxiety are explained to the extent of 14% by personality traits, 8% by coping with stress strategies with stress 2% cognitive emotion regulation strategies. The findings suggest that personality traits play a greater role than coping mechanisms in social anxiety symptoms. Nevertheless, the study conducted with nonclinical sample indicates that five-factor personality dimensions make much more extensive contribution to social anxiety symptoms (17). The difference in findings regarding the contribution of personality traits to social anxiety symptoms could be related to cultural factors. It has been suggested that the underlying mechanisms of social anxiety symptoms may differ in individualistic and collectivistic cultures (21). In this regard in our country, influenced by a collectivist-based culture, one could hypothesize that environmental and familial factors relative to personality traits may play a more substantial role in social anxiety symptoms (21). Furthermore, cognitive emotion regulation strategies contributing to social anxiety symptoms are quite low, not supporting the model that addresses the importance of cognitive mechanisms in the etiology of SAD (8). This may be due to the fact that the sample is not a clinical sample one.

Regarding the predictive role of the research variables, the symptoms of social anxiety are found to be negatively predicted by openness and extraversion, while positively predicted by negative valence. In this context, it can be said that openness and extraversion act as protective factors against social anxiety symptoms, whereas negative valence serves as a risk factor for social anxiety symptoms. Among coping strategies more engagement in helpless and submissive approaches and less engagement in putting into perspective predict social anxiety. In this regard, within the framework of the vulnerability model, these psychological structures that predicts social anxiety could be considered as predisposing risk factors.

The present results point to a number of clinical implications. The findings of the study suggest that openness, extraversion, and negative valence personality traits as well as helplessness and submissive approaches may serve as common predisposing and maintaining risk factors for social anxiety symptoms. In this context, these psychological constructs could be incorporated into cognitive-behavioral models of SAD. Furthermore, in line with the notion emphasizing the clinical significance of adaptive strategies in psychopathologies (22), the results indicate that individuals with high social anxiety symptoms use adaptive coping strategies less frequently. Therefore, instead of merely reducing maladaptive strategies in the treatment of individuals with social anxiety disorder, efforts to teach adaptive strategies may assist university students in coping more effectively with their social anxieties.

There are several limitations to the present study. The study has been conducted with students who are considered to be of a high socio-economic level. It has been stated that individuals who are in low socio-economic status are exposed to more stressful situations, resort to different coping methods and have a much higher risk of psychological disorders compared to middle and upper socio-economic individuals (30). Thus, more privileged economic back ground provides less conducive environment for psychological constructs underlying mechanisms of SAD. Future studies, having participants from different socio-economic levels would be more beneficial. Future research also should nonetheless replicate this study using a clinical sample with SAD. Despite these limitations, the present study provides potential psychological constructs for future research in the etiology of SAD.

Declarations

Funding: Not Applicable.

Conflicts of Interest: Not Applicable.

Ethics Approval: The Ethical Committee Approval for the study was granted by the Maltepe University Scientific Research Ethical Board on the date of 7.1.2019, It was decided to be ethically appropriate with decision numbers 2019/01 and 2019/01-08.

Data and Material: The Data and materials used in this research are available upon request.

Authors' Contributions

First Author: Conceived and designed the analysis; Contributed data or analysis tools; Performed the analysis; Wrote the paper.

Second Author: Collected the data, performed the analysis.

First Author: Conceived and designed the analysis; Contributed data or analysis tools; Performed the analysis; Wrote the paper.

Second Author: Collected the data, performed the analysis.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Association,2013.
2. Alden LE, Taylor CT. Interpersonal processes in social phobia. Clin Psychol Rev, 2004:24; 857-882
3. Baltacı Ö, Hamarta E. Analyzing the relationship between social anxiety, social support and problem solving approach of university students. Education & Science, 2013:38;226-240.
4. Bienvenu OJ, Nestadt G, Samuels JF and et al. Phobic, panic, and major depressive disorders and the five-factor model of personality. J Nerv Ment Dis, 2001:189;154–161.
5. Bienvenu OJ, Samuels JF, Costa PT, and et al. Anxiety and depressive disorders and the fivefactor model of personality: A higher-and lower order personality trait investigation in a community sample. Depress Anxiety, 2004: 20; 92-99.
6. Brouzos A, Vassilopoulos SP, Vlachioti A and et al. A coping-oriented group intervention for students waiting to undergo secondary school transition: Effects on coping strategies, self-esteem, and social anxiety symptoms. Psychol Sch, 2002:57(1);31–43.
7. Carver CS and Connor-Smith J. Personality and coping. Annual Rev Psychol, 2010:61;679 704.
8. 8.Clark DM and Wells A.A. Cognitive model of social phobia. In: Social Phobia: Diagnosis, Assessment, and Treatment. New York:Guilford Press.1995:p 69–93.
9. Costachel ME, Frick A, Månsson K and et al. Higher and lower-order personality traits and cluster subtypes in social anxiety disorder. PLoS One,2020:29;15(4):e0232187.
10. Dell'Osso L, Abelli M, Pini S and et al. Dimensional assessment of DSM-5 social anxiety symptoms among university students and its relationship with functional impairment. Neuropsychiatr Dis Treat, 2014;10:1325–1332.
11. Findlay LG, Coplan RJ and Bowker A. Keeping it all inside: Shyness, internalizingcoping strategies and socio-emotional adjustment in middle childhood. International Journal of Behavioral Development, 2009:33(1);47-54.
12. Garnefski N, Kraaij and Spinhoven P. Negative life events, cognitive emotion regulation and emotional problems. Pers Individ Dif, 2001;30(8):1311-1327.
13. Gençöz T and Öncül Ö. Examination of personality characteristics in a turkish sample: Development of basic personality traits inventory. J Gen Psychol, 2012;139(3):194-216.
14. Goldin PR, Manber T, Hakimi S and et al. Neural bases of social anxiety disorder: emotional reactivity and cognitive regulation during social and physical threat. Arch Gen Psychiatry, 2009; 66(2):170-180.
15. Kashdan TB, Steger M.Expanding the topography of social anxiety: An experience sampling assessment of positive emotions and events, and emotion suppression. Psychol Sci, 2016;17:120–128.
16. Kotov R, Gamez W, Schmidt F and et al. Linking "big" personality traits to anxiety, depressive, and substance use disorders: a meta-analysis. Psychol Bull, 2010:136(5);768-791.
17. Łakuta P. Personality Trait Interactions in Risk for and Protection against Social Anxiety Symptoms. J Psychol, 2019:153(6);599-614.
18. Lazarus RS, Folkman S. Coping and adaptation. In W. D. Gentry (Ed.), The handbook of behavioral

medicine,1984: (pp. 282-325). New York: Guilford
19. McCrae RR and Costa JPT. Personality trait structure as a human universal. Am Psychol, 1997:52(5);509-611.
20. Millon T, Kruege RF and Simonsen E. Contemporary directions in psychopathology: Scientific foundations of the DSM-5 and ICD-11. New York, NY: Guilford Press; 2011.
21. Mohammadi A, Abasi I, Soleimani M and et al.Cultural aspects of social anxiety disorder: A qualitative analysis of anxiety experiences and interpretation. Iranian J Psychiatry, 2019:14(1);33.
22. Min JA, Yu JJ, Lee CU and et al. Cognitive emotion regulation strategies contributing to resilience in patients with depression and/or anxiety disorders. Compr Psychiatry, 2013:54(8);1190-1197.
23. Norton GR, Cox BJ, Hewitt PL and et al. Personality factors associated with generalized and non-generalized social anxiety. Pers Individ Dif, 1997; 22(5):655-660.
24. Nowruzi M, Michaeli F and Eisa ZA. Prevalence of social anxiety disorder among students of Urmia University. Urmia medical journal.2016; 27(2): 155-166.
25. Onat O and Otrar M. Bilişsel duygu düzenleme ölçeğinin Türkçe'ye uyarlanması: Geçerlik ve güvenirlik çalışmaları. Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi, 2010; 31:123-143.
26. Rukmini S, Sudhir P M and Math SB. Perfectionism, emotion regulation and their relationship to negative affect in patients with social phobia. Indian J Psychol Med 2014; 36(3):239-255.
27. Soykan Ç, Özgüven HD and Gençöz T. Liebowitz social anxiety scale: The Turkish version. Psychol Rep. 2003; 93:1059-1069.
28. Şahin N H and Durak A. Stresle başa çıkma tarzları ölçeği: Üniversite öğrencileri için uyarlanması. Turkish Journal of Psychology. 1995;10(34):56-73.
29. Widiger TA and Costa PT. Five-factor model of personality disorder research. In P. T. Jr., Costa, & T. A., Widiger (Eds.), Personality Disorders and The Five-Factor Model of Personality (2nd ed., pp. 59–87), 2002: Washington, DC: American Psychological Association.
30. Wittchen HU and Fehm L. Epidemiology, patterns of comorbidity and associated disabilities of social phobia. Psychiatric Clinics, 2001;24(4): 617-641.